Service Instructions

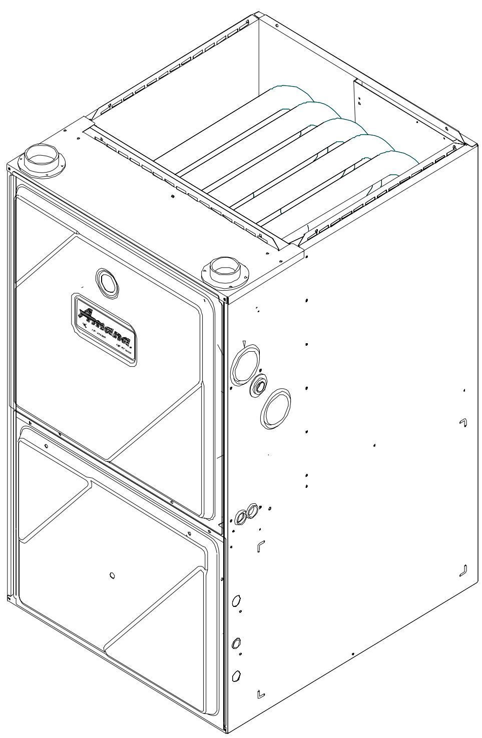
Model numbers listed on pages 4 & 5

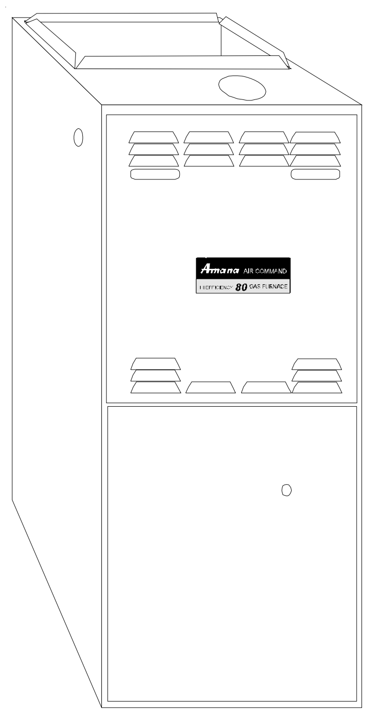
40" 80% Gas Furnaces & Accessories

GUIA, GCIA, GUIB, GCIB, GUIC, GCIC, GCID, GUID, GUIE, GUIS, GCIS, GUIV

40" 90% Gas Furnaces & Accessories

GCCA, GCLA, GCVA, GUCA, GULA, GUSA, GUVA





Heating & Air Conditioning
Amana
LASTS AND LASTS AND LASTS.™

This manual is to be used by qualified, professionally trained HVAC technicians only. Goodman does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

RS6600001 Rev. 2
November 2006

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IMPORTANT INFORMATION

Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service. Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. **REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.**

IMPORTANT NOTICES FOR CONSUMERS AND SERVICERS

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS

WARNING

This unit should not be connected to. or used in conjunction with, any devices that are not design certified for use with this unit or have not been tested and approved by Goodman. Serious property damage or personal injury, reduced unit performance and/or hazardous conditions may result from the use of devices that have not been approved or certifed by Goodman.

WARNING

Installation and repair of this unit should be performed <u>ONLY</u> by individuals meeting the requirements of an Entry Level Technician as specified by the Air Conditioning and Refrigeration Institute (ARI). Attempting to install or repair this unit without such background may result in product damage, personal injury, or death.

WARNING

To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.

WARNING

Goodman will not be responsible for any injury or property damage arising from improper service or service procedures. If you install or perform service on this unit, you assume responsibility for any personal injury or property damage which may result. Many jurisdictions require a license to install or service heating and air conditioning equipment.

WARNING



HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

IMPORTANT INFORMATION

⚠ WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

– DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

– **WHAT TO DO IF YOU SMELL GAS**:

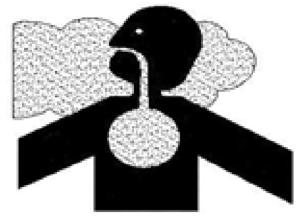
- DO NOT TRY TO LIGHT ANY APPLIANCE.
- DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
- IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.
- IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

– INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

⚠ WARNING

SHOULD OVERHEATING OCCUR OR THE GAS SUPPLY FAIL TO SHUT OFF, TURN OFF THE MANUAL GAS SHUTOFF VALVE EXTERNAL TO THE FURNACE BEFORE TURNING OFF THE ELECTRICAL SUPPLY.

DANGER
PELIGRO



CARBON MONOXIDE POISONING HAZARD

Special Warning for Installation of Furnace or Air Handling Units in Enclosed Areas such as Garages, Utility Rooms or Parking Areas

Carbon monoxide producing devices (such as an automobile, space heater, gas water heater, etc.) should not be operated in enclosed areas such as unventilated garages, utility rooms or parking areas because of the danger of carbon monoxide (CO) poisoning resulting from the exhaust emissions. If a furnace or air handler is installed in an enclosed area such as a garage, utility room or parking area and a carbon monoxide producing device is operated therein, there must be adequate, direct outside ventilation.

This ventilation is necessary to avoid the danger of CO poisoning which can occur if a carbon monoxide producing device continues to operate in the enclosed area. Carbon monoxide emissions can be (re)circulated throughout the structure if the furnace or air handler is operating in any mode.

CO can cause serious illness including permanent brain damage or death.

B10259-216

To locate an authorized servicer, please consult your telephone book or the dealer from whom you purchased this product. For further assistance, please contact:

CONSUMER INFORMATION LINE
AMANA® BRAND PRODUCTS
TOLL FREE 1-877-254-4729 (U.S. only)
email us at:
hac.consumer.affairs@amanahvac.com
fax us at: (931) 438- 4362
(Not a technical assistance line for dealers.)

Outside the U.S., call 1-931-433-6101.
(Not a technical assistance line for dealers.)
Your telephone company will bill you for the call.

PRODUCT IDENTIFICATION

The model and manufacturing number are used for positive identification of component parts used in manufacturing. Please use these numbers when requesting service or parts information.

G U I V 070 D X 50

Product Type
G: Gas Furnace

Supply Type
U: Upflow/Horizontal
C: Counterflow/Horizontal

Furnace Type
I: Induced Draft (80%) 2 Stage-Variable Speed

Model Family
V: Air Command 80 SSE IIQ Category 1

Nominal Input

070:	70,000 Btuh
090:	90,000 Btuh
115:	115,000 Btuh
140:	140,000 Btuh

Design Series
C: Third Design Series
D: Fourth Design Series

Additional Features *
A: Not NOx Certified
X: NOx Models

Airflow Capability
40: 1.5 to 4 Tons
50: 2.0 to 5.0 Tons

80%

GUIA***A**	GCIA***A**	GUIS***CA**
GUIA***B**	GCIA***CX**	GUIS***CX**
GUIA***CA**	GCIB***A**	GUIS***DA**
GUIB***A**	GCIC***CX**	GUIS***CA**
GUIB***B**	GCIC***DX**	GUIS***CA**
GUIB***CX**	GCIC***CX**	GUIS***CX**
GUIC***CA**	GCIC***CX**	GUIS***CX**
GUIC***CA**	GCIC***FX**	GUIS***FA**
GUIC***CA**	GCID***AX**	GUIS***FX**
GUIC***CX**	GUID***CA**	GCIS***CX**
GUIC***CX**	GUID***CA**	GCIS***CX**
GUIC***DA**	GUID***CA**	GCIS***CX**
GUIC***DA**	GUID***CA**	GCIS***FX**
GUIC***DX**	GUID***CX**	GUIV***DX**
GUIC***EA**	GUID***CX**	GUIV***CX**
GUIC***EX**	GUID***CX**	GUIV***CX**
GUIC***FA**	GUID***CX**	GUIV***FX**
GUIC***FX**	GUID***DA**	GUID***EA**
	GUID***DX**	GUID***GA**
		GUIE***EX**

PRODUCT IDENTIFICATION

The model and manufacturing number are used for positive identification of component parts used in manufacturing. Please use these numbers when requesting service or parts information.

G U C A 045 A X 30

Product Type
G: Gas Furnace

Supply Type
C: Counterflow/Horizontal
U: Upflow/Horizontal

Furnace Type
C: Condensing (90%)
S: 2-Stage Condensing (90%)

Model Family
A: Air Command 90 (40" Height)

Nominal Input

045:	45,000 Btuh
070:	70,000 Btuh
090:	90,000 Btuh
115:	115,000 Btuh

Design Series
A: First Series

Additional Features
X: NOx Models

Airflow Capability
30: 1.5 to 3.0 Tons
40: 2.5 to 4.0 Tons
50: 3.0 to 5.0 Tons

90%

GUCA***AX**	GCLA***AX**	GUVA***AX**
GUCA***AX**	GCLA***CX**	GUVA***AX**
GUCA***CX**	GCVA***BX**	GUVA***BX**
GCCA***AX**	GCVA***CX**	GUVA***BX**
GCCA***AX**	GULA***AX**	GUVA***CX**
GCCA***AX**	GULA***CX**	
GCCA***BX**	GUSA***BX**	
GCCA***CX**	GUSA***BX**	
	GUSA***CX**	

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUIA***A**	P1177301F- P1177308F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>A</u>** Air Command 80 SSE Furnace **<u>"A"</u>** Initial Design Series. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIA***B**	P1206601F- P1206608F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>A</u>** Air Command 80 SSE Furnace **<u>"B"</u>** Second Design Series. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIA***CA**	P1207201F- P1207208F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>A</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIB***A**	P1186401F- P1186408F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>B</u>** Air Command 80 SV Furnace **<u>"A"</u>** Initial Design Series. 40" 80% furnace featuring electronic ignition control, silicon carbide ignitor, radiant flame sensor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUIB***B**	P1206801F - P1206807F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>B</u>** Air Command 80 SV Furnace **<u>"B"</u>** Second Design Series. 40" 80% furnace featuring electronic ignition control, silicon carbide ignitor, radiant flame sensor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUIB***CX**	P1207701F - P1207707F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>B</u>** Air Command 80 SV Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring electronic ignition control, silicon carbide ignitor, radiant flame sensor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUIC***CA**	P1207601F - P1207608F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***CA**	P1229101F - P1229108F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet, 409 stainless steel tubular heat exchanger. *Change from embossed bottom knock-out to perforated bottom knock-out and addition of internal side filter retention.*
GUIC***CA**	P1229001F - P1229008F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUIC***CX**	P1207401F - P1207408F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***CX**	P1229201F - P1229208F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***CX**	P1229301F - P1229308F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger. *Change from embossed bottom knock-out to perforated bottom knock-out and addition of internal side filter retention*.
GUIC***DA**	P1222501F - P1222508F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"D"</u>** Fourth Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***DA**	P1226601F - P1226608F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>D</u>** Fourth Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor and 409 stainless steel tubular heat exchanger. *Use of smooth cold rolled steel substrate and a smooth top coat for furnace cabinet to replace prepainted furnaces until new coating is approved for prepainted material.*
GUIC***DX**	P1226701F - P1226708F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"D"</u>** Fourth Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor and 409 stainless steel tubular heat exchanger. *Use of smooth cold rolled steel substrate and a smooth top coat for furnace cabinet to replace prepainted furnaces until new coating is approved for prepainted material.*
GUIC***EA**	P1234001F - P1234008F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"E"</u>** Fifth Design Series **<u>"A"</u>** Standard Unit (not NOx certified). 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Norton mini igniter, and plug connect wiring harness. The furnaces also feature an integrated electronic ignition control, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***EX**	P1234101F - P1234108F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"E"</u>** Fifth Design Series **<u>"X"</u>** NOx certified. 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Norton mini igniter, and plug connect wiring harness. These furnaces also feature an integrated electronic ignition control, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***FA**	P1241801F - P1241808F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"F"</u>** Sixth Design Series **<u>"A"</u>** (Not NOx certified). 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Silicon Nitride Igniter, and plug connect wiring harness. These furnaces also feature an integrated electronic ignition control, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIC***FX**	P1241901F - P121908F	**<u>G</u>**as Furnace **<u>U</u>**pflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"F"</u>** Sixth Design Series **<u>"X"</u>** NOx certified. 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Silicon Nitride Igniter, and plug connect wiring harness. These furnaces also feature an integrated electronic ignition control, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GCIA***A**	P1177401F- P1177408F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>A</u>** Air Command 80 SSE Furnace **<u>"A"</u>** Initial Design Series. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCIA***CX**	P1207301F - P1207308F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>A</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCIB***A**	P1186501F - P1186508F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>B</u>** Air Command 80 SV Furnace **<u>"A"</u>** Initial Design Series. 40" 80% furnace featuring electronic ignition control, silicon carbide ignitor, radiant flame sensor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GCIC***CX**	P1207501F - P1207508F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCIC***DX**	P1226801F - P1226807F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"D"</u>** Fourth Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor and 409 stainless steel tubular heat exchanger. *Use of smooth cold rolled steel substrate and a smooth top coat for furnace cabinet to replace prepainted furnaces until new coating is approved for prepainted material.*
GCIC***CX**	P1230401F - P1230408F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor and 409 stainless steel tubular heat exchanger. *Release of prepainted G30 galvanized steel cabinet parts to replace post painted parts on furnace.*
GCIC***CX**	P1230501F - P1230508F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"C"</u>** Third Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger. *Change from embossed bottom knock-out to perforated bottom knock-out and addition of internal side filter retention.*
GCIC***FX**	P1234401F - P1234408F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>C</u>** Air Command 80 SSE Furnace **<u>"F"</u>** Sixth Design Series **<u>"X"</u>** NOx Certified. 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Silicon Nitride Igniter, and plug connect wiring harness. These furnaces also feature an integrated electronic ignition control, prepainted textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCID***AX**	P1249702F- P1249706F	**<u>G</u>**as Furnace **<u>C</u>**ounterflow/Horizontal **<u>I</u>**nduced Draft **<u>D</u>** Air Command 80 SSE Furnace **<u>"A"</u>** First Design Series **<u>"X"</u>** NOx Certified. The 40" 80% furnace features an integrated electronic ignition control, prepainted textured steel cabinet. Changes include Silicon Carbide Mini Igniter and aluminized steel tubular heat exchanger.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUID***CA**	P1212401F - P1212407F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUID***CA**	P1220601F - P1220607F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and aluminized steel tubular heat exchanger. *Release of Fasco induced draft blower to replace Jakel induced draft blower.*
GUID***CA**	P1229401F - P1229407F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and aluminized steel tubular heat exchanger.
GUID***CA**	P1229501F - P1229507F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUID***CX**	P1212501F - P1212507F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUID***CX**	P1220501F - P1220507F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger. *Release of Fasco induced draft blower to replace Jakel induced draft blower.*
GUID***CX**	P1229601F - P1229607F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and aluminized steel tubular heat exchanger.
GUID***CX**	P1229701F - P1229705F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and aluminized steel tubular heat exchanger.
GUID***DA**	P1226901F - P1226911F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"D"** Fourth Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor and aluminized steel tubular heat exchanger. *Use of smooth cold rolled steel substrate and a smooth top coat for furnace cabinet to replace prepainted furnaces until new coating is approved for prepainted material.*
GUID***DX**	P1227001F - P1227009F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SV Furnace **"D"** Fourth Design Series **"X"** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and aluminized steel tubular heat exchanger. *Use of 10x8 blower assembly on 070__40 model to upgrade airflow to a full 4 tons of air for air conditioning and also release of new circulation motor on 090,115 and 140__50 models.*

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUIS***CA**	P1211003F - P1211008F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% two-stage furnace featuring integrated electronic ignition control, two-stage gas valve, two-speed induced draft blower, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIS***CX**	P1211103F - P1211107F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIS070DA35	P1227103F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"D"** Fourth Design Series **"A"** Standard Unit (not NOx certified). 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower and 409 stainless steel tubular heat exchanger. *Use of smooth cold rolled steel substrate and a smooth top coat for furnace cabinet to replace prepainted furnaces until new coating is approved for prepainted material.*
GUIS***CA**	P1229803F - P1229808F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIS***CA**	P1229903F - P1229907F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"A"** Standard Unit (not NOx certified). 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger. *Change from embossed bottom knock-out to perforated bottom knock-out and addition of internal side filter retention.*
GUIS***CX**	P1230003F - P1230007F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIS***CX**	P1230103F - P1230107F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% furnace featuring integrated electronic ignition control, silicon carbide ignitor, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger. *Change from embossed bottom knock-out to perforated bottom knock-out and addition of internal side filter retention.*
GUIS***FA**	P1246703F - P1246708F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"F"** Sixth Design Series **"A"** (not NOx Certified). 40" 80% furnace featuring a new integrated electronic ignition control, silicon nitride ignitor, new wiring harness, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIS***FX**	P1246803F - P1246807F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"F"** Sixth Design Series **"X"** NOx Certified. 40" 80% furnace featuring a new integrated electronic ignition control, silicon nitride ignitor, new wiring harness, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GCIS*CX****	P1211203F - P1211205F	**G**as Furnace **C**ounterflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCIS*CX****	P1230603F - P1230605F	**G**as Furnace **C**ounterflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCIS*CX****	P1230703F - P1230705F	**G**as Furnace **C**ounterflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% two-stage furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GCIS*FX****	P1247003F - P1247005F	**G**as Furnace **C**ounterflow/Horizontal **I**nduced Draft **S** 2-Stage, Air Command 80 SSE II Furnace **"F"** Sixth Design Series **"X"** NOx Certified. 40" 80% two-stage furnace featuring a new integrated electronic ignition control, new silicon nitride ignitor, new wire harnesses, two-stage gas valve, two-speed induced draft blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIV*DX****	P1227403F - P1227408F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **V**ariable Speed, 2-Stage, Air Command 80 SSE II Q Furnace **"D"** Fourth Design Series **"X"** NOx Certified. 40" 80% two-stage variable speed furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, variable speed circualtor blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIV*CX****	P1230203F - P1230208F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **V**ariable Speed, 2-Stage, Air Command 80 SSE II Q Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% two-stage variable speed furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, *prepainted* textured steel cabinet and 409 stainless steel tubular heat exchanger.
GUIV*CX****	P1230303F - P1230308F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **V**ariable Speed, 2-Stage, Air Command 80 SSE II Q Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 80% two-stage variable speed furnace featuring integrated electronic ignition control, silicon carbide ignitor, two-stage gas valve, two-speed induced draft blower, variable spped circulator blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger. *Change from embossed bottom knock-out to perforated bottom knock-out and addition of internal side filter retention.*
GUIV*FX****	P1246903F, P1246905F, P1246907F, P1246908F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **V**ariable Speed, 2-Stage, Air Command 80 SSE II Q Furnace **"D"** Fourth Design Series **"X"** NOx Certified. 40" 80% two-stage variable speed furnace featuring integrated electronic ignition control, silicon nitride ignitor, two-stage gas valve, two-speed induced draft blower, variable speed circualtor blower, electrodepositioned textured steel cabinet and 409 stainless steel tubular heat exchanger.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUID*EA****	P1234201F - P1234207F P1244902F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SSE Furnace **"E"** Fifth Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Norton mini igniter, and plug connect wiring harness. The furnaces also feature an integrated electronic ignition control, *prepainted* textured steel cabinet and aluminized steel tubular heat exchanger.
GUID*GA****	P1245901F - P1245907F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **D** Air Command 80 SSE Furnace **"G"** Sixth Design Series **"A"** Standard Unit (not NOx certified). 40" 80% furnace redesign incorporating feature changes which include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Norton mini igniter, and plug connect wiring harness. The furnaces also feature an integrated electronic ignition control, White Rodgers "G" Gas Valve, removal of internal filter capability, *prepainted* textured steel cabinet and aluminized steel tubular heat exchanger.
GUIE*EX****	P1241001F - P1241007F	**G**as Furnace **U**pflow/Horizontal **I**nduced Draft **E** (High Static Line) Air Command 80 HS Furnace **"E"** Fifth Design Series **"X"** NOx certified. 40" 80% furnace redesign incorporating feature changes introduced by the new 40" 90% furnaces. Changes include standardized blower decks, access door, blower door, scroll wrap, burner bracket, Norton mini igniter, and plug connect wiring harness. The furnaces also feature an integrated electronic ignition control, *prepainted* textured steel cabinet, insulated blower compartment, aluminized steel tubular heat exchanger along with the blower compartment door being sealed to minimize the amount of air leakage (less then 1% air leakage) and the blower compartment insulated with the same insulation as used in the 90% furnace blower comparement. **Note:** The filter rails are not installed in the cabinet but are taped to the basepan for shipment.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUCA*AX****	P1219301F - P1219306F P1227501F - P1227506F P1228801F - P1228806F P1228901F - P1228906F	**G**as Furnace **U**pflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon carbide *mini* ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil.
GUCA*AX****	P1239301F - P1239306F	**G**as Furnace **U**pflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon carbide *mini* ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.
GUCA*CX****	P1252601F P1252602F ***** P1252603F P1252604F ***** P1252605F P1252606F *****	**G**as Furnace **U**pflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon carbide *mini* ignitor, 316L Header Plates, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement. Select models utilize a 2 row secondary recouperative coil (ONLY the * next to the manufacturing "P" number indicates the furnaces using a 2 row secondary recouperative coil).
GCCA*AX****	P1227601F - P1227606F	**G**as Furnace **C**ounterflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon carbide *mini* ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil.
GCCA*AX****	P1232401F - P1232406F	**G**as Furnace **C**ounterflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon carbide mini ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil.
GCCA*AX****	P1239401F - P1239406F	**G**as Furnace **C**ounterflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon carbide mini ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.
GCCA*BX****	P1241701F - P1241706F	**G**as Furnace **C**ounterflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"B"** Second Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon **nitride** ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GCCA***CX**	P1252701F P1252702F * P1252703F P1252704F * P1252705F P1252706F *	**G**as Furnace **C**ounterflow/Horizontal **C**ondensing **A** Air Command 90 Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, silicon **nitride** ignitor, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil. Select models utilize a 2 row secondary recouperative coil (ONLY the * next to the manufacturing "P" number indicates the furnaces using a 2 row secondary recouperative coil).
GCLA***AX**	P1249802F- P1249806F	**G**as Furnace **C**ounterflow/Horizontal **L**Condensing Furnace **A** Air Command 90 Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% single stage furnace featuring an integrated electronic ignition control, prepainted textured steel cabinet, Silicon Carbide Mini Igniter and aluminized steel tubular heat exchanger.
GCLA***CX**	P1253202F * P1253204F * P1253206F *	**G**as Furnace **C**ounterflow/Horizontal **L**Condensing Furance **A** Air Command 90 Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, carbide mini nitride ignitor, electrodepositioned steel cabinet and aluminized steel tubular heat exchanger and stainless steel recouperative coil. Models listed utilize a 2 row secondary recouperative coil (the * next to the manufacturing "P" number indicates the furnaces using a 2 row secondary recouperative coil). GCLA units are shipped non-direct vent but can be installed as direct vent by adding the intake air coupling and appropriate field supplied pipe.
GCVA***BX**	P1237403F - P1237405F P1242203F - P1242205F	**G**as Furnace **C**ounterflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Air Command 95 II Q Furnace **"B"** Second Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, variable speed circulator blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger.
GCVA***CX**	P1253003F - P1253005F	**G**as Furnace **C**ounterflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Standard 40" Line **"C"** Third Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, 316L Header Plates, prepainted steel cabinet and 409 stainless steel tubular heat exchanger.
GULA***AX**	P1245801F - P1245806F	**G**as Furnace **U**pflow/Horizontal **L**Distinction 92% **A** Standard Line Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, insulated blower compartment, 4-speed blower motor, silicon carbide *mini* ignitor, electrodepositioned steel cabinet and aluminized steel tubular heat exchanger and stainless steel recouperative coil. GULA units are shipped non-direct vent but can be installed as direct vent by adding the intake air coupling and appropriate field supplied pipe.
GULA***CX**	P1253101F * P1253102F P1253103F * P1253104F * P1253105F P1253106F *	**G**as Furnace **U**pflow/Horizontal **L**Distinction 92% **A** Standard Line Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 90% furnace featuring integrated electronic ignition control, insulated blower compartment, 4-speed blower motor, silicon carbide *mini* ignitor, 316L Header Plates, electrodepositioned steel cabinet and aluminized steel tubular heat exchanger and stainless steel recouperative coil. Select models utilize a 2 row secondary recouperative coil (ONLY the * next to the manufacturing "P" number indicates the furnaces using a 2 row secondary recouperative coil). GULA units are shipped non-direct vent but can be installed as direct vent by adding the intake air coupling and appropriate field supplied pipe.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
GUSA***BX**	P1233902F - P1233906F	**G**as Furnace **U**pflow/Horizontal **S** 2-Stage, Condensing **A** Air Command 90 Furnace **"B"** Second Design Series **"X"** NOx Certified. 40" 90% two-stage furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger.
GUSA***BX**	P1239502F - P1239506F P1242002F - P1242006F	**G**as Furnace **U**pflow/Horizontal **S** 2-Stage, Condensing **A** Air Command 90 Furnace **"B"** Second Design Series **"X"** NOx Certified. 40" 90% two-stage furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.
GUSA***CX**	P1252802F - P1252806F	**G**as Furnace **U**pflow/Horizontal **S** 2-Stage, Condensing **A** Air Command 90 Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 90% two-stage furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger, 316L Header Plates, Silicon Gaskets, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.
GUVA***AX**	P1228301F - P1228306F	**G**as Furnace **U**pflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Air Command 95 II Q Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring integrated electronic ignition control, silicon carbide *mini* ignitor, two-stage gas valve, two-speed induced draft blower, variable spped circulator blower, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil.
GUVA***AX**	P1232501F - P1232506F	**G**as Furnace **U**pflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Air Command 95 II Q Furnace **"A"** First Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring integrated electronic ignition control, silicon carbide *mini* ignitor, two-stage gas valve, two-speed induced draft blower, variable speed circulator blower, electrodepositioned steel cabinet and 409 stainless steel tubular heat exchanger and stainless steel recouperative coil.
GUVA***BX**	P1234701F - P1234706F	**G**as Furnace **U**pflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Air Command 95 II Q Furnace **"B"** Second Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, variable spped circulator blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger.
GUVA***BX**	P1239601F - P1239606F P1242101F - P1242106F	**G**as Furnace **U**pflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Air Command 95 II Q Furnace **"B"** Second Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, variable speed circulator blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.
GUVA***CX**	P1252901F - P1252906F	**G**as Furnace **U**pflow/Horizontal **V**ariable Speed, 2-Stage, Condensing **A** Air Command 95 II Q Furnace **"C"** Third Design Series **"X"** NOx Certified. 40" 95% two-stage variable speed furnace featuring *"intell-ignition" integrated electronic ignition control, silicon nitride ignitor,* two-stage gas valve, two-speed induced draft blower, variable speed circulator blower, prepainted steel cabinet and 409 stainless steel tubular heat exchanger, 316L Header Plates, Silicon Gasket, electrical junction box relocation from blower compartment to the burner compartment and incorporation of coarser threaded thumb screw and U-clips instead of clinched inserts for engagement.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
ASB01	P1200201F - P1200202F	**A**djustable **S**ubbase Kit. For use with Amana furnace models *GCIA, GCIB, GCIC and GCIS:* Must be used to prevent excessive temperature from reaching combustible materials, if the furnace is installed on a combustible floor. This subbase effectively separated the furnace base and plenum from combustible materials. To ensure safe installation, do not install the counterflow floor base directly on carpeting, tile, or other combustible material other than wood flooring.
CFB16-24	P1228001F - P1228003F	**C**ounterflow **F**loor **B**ase Kit. For use with Amana furnace models *GCCA:* Must be used to prevent excessive temperature from reaching combustible materials, if the furnace is installed on a combustible floor. This subbase effectively separated the furnace base and plenum from combustible materials. To ensure safe installation, do not install the counterflow floor base directly on carpeting, tile, or other combustible material other than wood flooring.
CVK4-7	P1210001F- P1210004F	**C**ommon **V**ent **K**it. For use with Amana 80% furnace models *GUIA, GUIB, GUIC, GUID, GCIA, GCIB and GCIC.* Must be used on each furnace that is common vented into type B-1 vent system. Only Amana Air Command SSE and SV models listed can be common vented with this kit and may not be common vented with any other type furnaces. The common vent kit is not intended for use on other appliances. When the correct venting system has been designed for the installation, a Common Vent Kit is selected. These kits come in 4, 5, 6 and 7 inch versions.
DEHUM1	P1227801F	**D**ehumidistat. For use with Amana two-stage variable speed furnace models *GUIV, GUVA and GCVA.* Wall mounted, 24 volt humidity control available as a Dehumidistat used to reduce the airflow in the air conditioning mode when necessary to lower the humidity in an occupied home to prevent dew build-up associated with high humidity levels. This control features a moisture-sensitive nylon element and also provides positive ON-OFF settings for manual operation. The control is a normally closed switch that opens on humidity rise causing the blower to switch to a lower speed to control the humidity within the structure.
EAC4	P9458403F	**Electronic Air Cleaner**
EAC5	P1123001F	**Electronic Air Cleaner**
EFR01	P1221001F	**E**xternal **F**ilter **R**ack Kit. For use with Amana upflow furnace models *GUIA, GUIB, GUIC, GUID, GUIE, GUIS, GUCA, GULA, GUVA and GUSA.* This kit is intended to provide a location, external to the furnace casing, for installation of a permanent filter. The rack is mounted over the indoor air blower compartment area of either side panel, and provide filter retention as well as a location for attaching return air ductwork.
FTK03A	P1171303F - P1171305F	**F**urnace **T**winning **K**it. This kit allows two Amana Air Command gas furnaces containing an Integrated Ignition control to operate at the same time from a single thermostat. The two furnaces to be "twinned" must be the exact same model with their circulating air blowers set to deliver the same air flow at the same time. The furnaces may deliver different CFM's in the cooling mode, if applicable. This kit cannot be used to control more than two furnaces.
HAC1PS1-14	P1204211F - P1204226F	**H**igh **A**ltitude **P**ressure **S**witch Kit. For use with Amana furnace models *GUIA, GUIB, GUIC, GUID, GCIA, GCIB and GCIC*. These kits contain a high altitude Category I pressure switch that must be used at altitudes above the rated altitudes because of reduced air density.
HAC1PS15	P1204227F	**H**igh **A**ltitude **P**ressure **S**witch Kit. For use with Amana furnace models *GUIC**EA, GUIC**FA, GUIC**EX, GUIC**FX, GUID**EA, GUIE**EX*. These kits contain a high altitude Category I pressure switch that must be used at altitudes above the rated altitudes because of reduced air density.

PRODUCT IDENTIFICATION

This section will identify the models covered and the changes per each model group from one release to the next.

Model #	Manufacturing #	Description
HALP05-09	P1129105F - P1129111F	**H**igh **A**ltitude **P**ropane Gas Conversion Kit. For use with Amana furnace models *GUIA, GUIB, GUIC, GUID, GCIA, GCIB and GCIC.* These kits are required when installing Amana Air Command 80 SSE and SV furnaces above their maximum rated altitude. These kits contain propane gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HALP10	P1129112F	**H**igh **A**ltitude **P**ropane Gas Conversion Kit. For use with Amana furnace models *GUCA and GCCA.* This kit is required when installing Amana Air Command 90 SSE furnaces above their maximum rated altitude. This kit contains propane gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HALP11	P1129113F	**H**igh **A**ltitude **P**ropane Gas Conversion Kit. For use with Amana furnace models *GUVA.* This kit is required when installing Amana Air Command 95 SSE furnaces above their maximum rated altitude. These kits contain propane gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HALP12	P1129114F	**H**igh **A**ltitude **P**ropane Gas Conversion Kit. For use with Amana furnace models *GUIC**EA, GUIC**FA, GUIC**EX, GUIC**FX, GUID**EA, GUIE**EX.* This kit is required when installing Amana Air Command 95 SSE furnaces above their maximum rated altitude. These kits contain propane gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HALP13	P1129115F	**H**igh **A**ltitude **P**ropane Gas Conversion Kit. For use with Amana furnace models *GUSA070*X35, GUSA090*X40, GUSA090*X50, GUSA115*X50, GCVA090*X50, GCVA115*X50.* This kit is required when installing Amana Air Command 90 furnaces above their maximum rated altitude. These kits contain propane gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HANG07	P1129007F - P1129010F	**H**igh **A**ltitude **N**atural **G**as Kit. For use with Amana furnace models *GUIA, GUIB, GUIC, GUID, GCIA, GCIB and GCIC.* These kits are required when installing Amana Air Command 80 SSE and SV furnaces above their maximum rated altitude. This kit contains natural gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HANG11-12	P1210305F - P1210306F	**H**igh **A**ltitude **N**atural **G**as Kit. For use with Amana furnace models *GUCA and GCCA.* These kits are required when installing Amana Air Command 90 SSE furnaces above their maximum rated altitude. This kit contains natural gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.

PRODUCT IDENTIFICATION

Model #	Manufacturing #	Description
HANG13-14	P1210307F - P1210308F	**H**igh **A**ltitude **N**atural **G**as Kit. For use with Amana furnace models *GUVA.* These kits are required when installing Amana Air Command 95 SSE furnaces above their maximum rated altitude. This kit contains natural gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HANG15	P1210309F	**H**igh **A**ltitude **N**atural **G**as Kit. For use with Amana furnace models *GUIC**EA, GUIC**FA, GUIC**EX, GUIC**FX, GUID**EA, GUIE**EX.* These kits are required when installing Amana Air Command 95 SSE furnaces above their maximum rated altitude. This kit contains natural gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HANG16	P1210310F	**H**igh **A**ltitude **N**atural **G**as Kit. For use with Amana furnace models *GUSA070*X35, GUSA090*X40, GUSA090*X50, GUSA115*X50, GCVA090*X50, GCVA115*X50.* These kits are required when installing Amana Air Command 90 furnaces above their maximum rated altitude. This kit contains natural gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit.
HAPS27-29	P1210518F - P1210520F	**H**igh **A**ltitude **P**ressure **S**witch Kit. For use with Amana furnace models *GUCA, GCCA and GUVA.* This kit contains a high altitude pressure switch that must be used at altitudes above the rated altitudes because of reduced air density.
HAPS30	P1210521F	**H**igh **A**ltitude **P**ressure **S**witch Kit. For use with Amana furnace models *GUSA070*X35, GUSA090*X40, GUSA090*X50, GUSA115*X50.* This kit contains a high altitude pressure switch that must be used at altitudes above the rated altitudes because of reduced air density.
HAPS31	P1210522F	**H**igh **A**ltitude **P**ressure **S**witch Kit. For use with Amana furnace models *GCVA090*X50, GCVA115*X50.* This kit contains a high altitude pressure switch that must be used at altitudes above the rated altitudes because of reduced air density.
HATS01-09	P1220406F - P1220414F	**H**igh **A**ltitude **T**wo-**S**tage Conversion Kit. For use with Amana furnace models *GUIS, GCIS and GUIV.* These kits are required when installing Amana Air Command 80 SSE II furnaces above their maximum rated altitude. These kits contain a pressure switch assembly and natural gas orifices. The orifices in the kit have been selected as a result of testing with the American Gas Association. They will provide appropriate derating at the altitude listed in the High Altitude Charts as shown in the installation instructions of the kit. A different pressure switch must be used at altitudes above the rated altitudes because of reduced air density.
HCVK	P1211401F	**H**orizontal **C**oncentric **V**ent **K**it. For use with Amana furnace models *GUCA, GCCA, GUVA and GUSA.* This kit is designed to allow terminations of a direct vent furnace to be "concentrically" vented through a wall. This kit allows a single penetration to support terminations for both the vent/flue and the combustion air intake pipe. Horizontal concentric vent kits can be installed through walls having a minimum thickness of 3/4 inch to a maximum of 13-3/4 inches thickness. This kit is not certified for, and must not be applied to any furnace not listed above.
LPLP01	P1237701F	**LP** Gas **L**ow **P**ressure **K**it. Designed for application on Amana's gas fired furnace product installed on LP gas. The kit monitors gas line pressure with a pressure switch and disables the unit's gas valve if the line pressure drops below acceptable levels. Application of the LPLP kit is aimed at reducing the occurance of sooted heat exchangers in product installed on LP gas.
LPTK09	P1200108F	**P**ropane Conversion **K**it. For use with Amana Air Command furnace models *GUIA, GUIB, GUIC, GUID, GCIA, GCIB, GCIC, GUIS, GCIS, GUIV, GUCA, GCCA, GUVA and GUSA.* This kit converts Amana gas fired units from natural to propane gas. The conversion from natural gas (as shipped from the factory) to propane gas requires: replacing the burner orifices, replacing gas valve regulator spring (all single stage units), removing NOx screens/turbulators (screens/turbulators not used on all units) and applying identification labels.

PRODUCT IDENTIFICATION

Model #	Manufacturing #	Description
MAC1	P1221801F	**M**edia **A**ir **C**leaner. For use with *all* Amana furnace models. The Amana Media Air Cleaner (Air Bear®) is a high efficiency air filtration device designed to remove dirt, dust, pollen and other microscopic particles from the air passing through it. Flexible performance range up to 2,000 CFM capacity. The air cleaner should be installed in the system so that all the system air is circulated through the air cleaner. The air cleaner will only remove the airborne contaminants delivered to it. Maximum performance is obtained when the system blower is set for continuous operation. **Note:** The Amana Media series of air cleaners can easily be upgraded to a highly efficient EAC5 Electronic Air Cleaner with a permanent washable collecting cell.
MAF1	P1221901F	**M**edia **A**ir **F**ilter. The filter in the Amana Media Air Cleaner (MAC1) must be replaced periodically. The filter cartridges should be replaced with a Trion Air Bear® filter cartridge. These come from Amana in cartons of three. The frequency of filter replacement if best determined by visual examination. With typical residential use the approximate replacement period is 9 - 12 months.
TSRK01	P1232601F	**T**wo-**S**tage **R**elay **K**it. For use with Amana two-stage furnace models *GUIS*, GCIS*, GUIV* and GUVA-AX.* This kit enables the use of a single stage thermostat with any Amana two-stage furnace. The time delay activates the second stage of heat after the furnace has run a set period of time (adjustable) on low stage heat. The time delay is adjustable from 6 to 20 minutes. The time delay starts the moment the thermostat initially calls for heat. Longer time delays will be more energy efficient, while shorter time delays will heat the home faster when the heating demand is high.
VCVK	P1211402F	**V**ertical **C**oncentric **V**ent **K**it. For use with Amana furnace models *GUCA, GULA, GCLA, GCVA, GCCA, GUVA and GUSA.* This kit is designed to allow terminations of a direct vent furnace to be "concentrically" vented through the roof. This kit allows a single penetration to support terminations for both the vent/flue and the combustion air intake pipe. Vertical concentric vent kits can be installed through roof penetrations having a minimum of 3/4 inch to a maximum of 22 inches thickness. NOTE: Does not apply to FX models.

*Does not apply to FX models

OPERATING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages matériels, des lésions corporelles ou la perte de vies humaines.

A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.

B. AVANT DE LE FAIRE FONCTIONNER, renifler tout autour de l'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

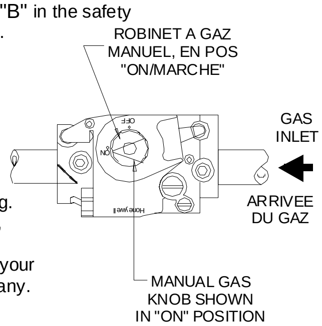
QUE FAIRE S'IL Y A UNE ODEUR DE GAZ
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais emploer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la reparer peut déclencher une explosion ou un incendie.

D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the gas control knob clockwise ↷ to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this Label. If you don't smell gas, go to next step.
7. Turn gas control knob counterclockwise ↶ to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHE

1. ARRETÊR! Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Tourner le robinet a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the gas control knob clockwise ↷ to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072702

OPERATING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages matériels, des lésions corporelles ou la perte de vies humaines.

A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.

B. AVANT DE LE FAIRE FONCTIONNER, renifler tout autour de l'appareil pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais emploer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la reparer peut déclencher une explosion ou un incendie.

D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

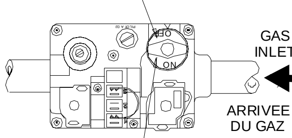
OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the gas control knob clockwise ↷ to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this Label. If you don't smell gas, go to next step.
7. Turn gas control knob counterclockwise ↶ to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.

ROBINET A GAZ MANUEL, EN POS "ON/MARCHE"

GAS INLET

ARRIVEE DU GAZ



MANUAL GAS KNOB SHOWN IN "ON" POSITION

MISE EN MARCHE

1. ARRETÊR! Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Tourner le robinet a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the gas control knob clockwise ↷ to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072703

OPERATING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages matériels, des lésions corporelles ou la perte de vies humaines.

A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.

B. AVANT DE LE FAIRE FONCTIONNER, renifler tout autour de l'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

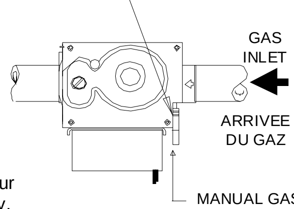
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais emploer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la reparer peut déclencher une explosion ou un incendie.

D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the gas control lever clockwise ↷ to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this Label. If you don't smell gas, go to next step.
7. Turn gas control lever counterclockwise ↶ to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHE

1. ARRETÊR! Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Torner le levier a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivante.
7. Tourner le levier a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the gas control lever clockwise ↷ to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Torner le levier a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072706

OPERATING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push in or turn the gas control lever. Never use tools. If the lever will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages matériels, des lésions corporelles ou la perte de vies humaines.

A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.

B. AVANT DE LE FAIRE FONCTIONNER, renifler tout autour de l'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

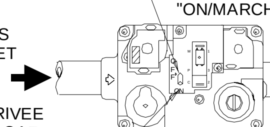
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le levier d'admission du gaz qu'à la main; ne jamais emploer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la reparer peut déclencher une explosion ou un incendie.

D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Push the gas control lever to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety. Information above on this label if you don't smell gas, go to next step.
7. Push gas control lever to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHE

1. ARRETÊR! Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Pousse le levier du contrôle du gaz à "OFF/ ARRET" position.
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Pousse le levier du contrôle du gaz à "ON/MARCHE" position.
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Push the gas control lever to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Pousse le levier du contrôle du gaz à "OFF / ARRET" position. Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072707

OPERATING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to turn the gas control knob. Never use tools. If the knob will not turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages matériels, des lésions corporelles ou la perte de vies humaines.

A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.

B. AVANT DE LE FAIRE FONCTIONNER, renifler tout autour de l'appariel pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

QUE FAIRE S'IL Y A UNE ODEUR DE GAZ

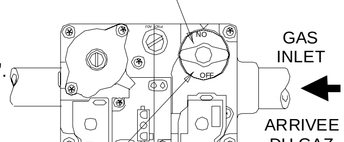
- Ne pas tenter d'allumer l'appariel
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le robinet d'admission du gaz qu'à la main; ne jamais emploer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la reparer peut déclencher une explosion ou un incendie.

D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Turn the gas control knob clockwise ↷ to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety information above on this Label. If you don't smell gas, go to next step.
7. Turn gas control knob counterclockwise ↶ to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHE

1. ARRETÊR! Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET"
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Tourner le robinet a gaz dans le sens inverse des aigilles d'ne montre ↶ en pos "ON/MARCHE".
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Turn the gas control knob clockwise ↷ to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Torner le robinet a gaz dans le sens des aigilles d'une montre ↷ en position "OFF/ARRET". Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072708

OPERATING INSTRUCTIONS

FOR YOUR SAFETY READ BEFORE OPERATING

WARNING: If you do not follow these instructions explosion may result causing property damage, personal injury or loss of life.

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE OPERATING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS
- Do not try to light any appliance.
- Do not touch any electric switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

C. Use only your hand to push in or turn the gas control lever. Never use tools. If the lever will not push in or turn by hand, don't try to repair it, call a qualified service technician. Force or attempted repair may result in a fire or explosion.

D. Do not use this appliance if any part has been underwater. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been underwater.

LIRE AVANT DE METTRE EN MARCHELIRE

AVERTISSEMENT: Quiconque ne respecte pas á la lettre les instructions dans le présent manuel risque de déclecher un incendie ou une explosion entraînant des dammages matériels, des lésions corporelles ou la perte de vies humaines.

A. Cet appareil ne comporte pas de veilleuse. Il est muni d'un dispositif d'allumage qui allume automatiquement le brûleur. Ne pas tenter d'allumer le brûleur manuellement.

B. AVANT DE LE FAIRE FONCTIONNER, renifler tout autour de l'appareil pour déceler une odeur de gaz. Renifler près du plancher, car certains gaz sont plus lourds que l'air et peuvent s'accumuler au niveau du so.l

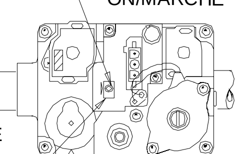
QUE FAIRE S'IL Y A UNE ODEUR DE GAZ
- Ne pas tenter d'allumer l'appareil
- Ne toucher aucun interrupteur électrique; n'utiliser aucun téléphone dans le bâtiment.
- Appeler immédiatement le fournisseur de gaz en employant le téléphone dún voisin. Respecter à la lettre les instructions du fournisseur de gaz.
- Si personne ne répond, appeler le service des incendies.

C. Ne pousser ou tourner le levier d'admission du gaz qu'à la main; ne jamais emploer d'outil à cet effet. Si la manette reste coincée, ne pas tenter de la réparer; appeler un technicien qualifié. Quiconque tente de forcer la manette ou de la reparer peut déclencher une explosion ou un incendie.

D. Ne pas se servir de cet appareil s'il a été plongé dans l'eau, complètement ou en partie. Appeler un technicien qualifié pour inspecter l'appareil et remplacer tout partie du système de contrôle et toute commande qui ont été plongés dans l'eau.

OPERATING INSTRUCTIONS

1. STOP! Read the safety information above on this label.
2. Set the thermostat to lowest setting.
3. Turn off all power to the appliance.
4. This appliance is equipped with an ignition. device which automatically lights the burner. Do not try to light the burner by hand.
5. Push the gas control lever to "OFF" Position. Do not force.
6. Wait five (5) minutes to clear out any gas. Then smell for gas, including near the floor. If you then smell gas, STOP! Follow "B" in the safety. Information above on this label if you don't smell gas, go to next step.
7. Push gas control lever to "ON".
8. Replace access panel.
9. Turn on all electric power to the appliance.
10. Set thermostat to desired setting.
11. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" and call your service technician or gas company.



MISE EN MARCHE

1. ARRETÊR! Lisez les instructions de sécurité sur la portion supérieure de cette étiquette.
2. Régler le thermostat à la température la plus basse
3. Couper l'alimentation électrique de l'appareil.
4. Cet appareil ménager étant doté d'un système d'allumage automatique, ne pas essayer à allumer le brûleur manuellement.
5. Pousse le levier du contrôle du gaz à "OFF/ ARRET" position.
6. Attendre cinq (5) minutes pour laisser echapper tout le gaz. Renifler tout autour de l'appareil, y compris près du plancher, pour déceler une odeur de gaz. Si c'est le cas, ARRETER! Passer à l'étape B des instructions de sécuritié sur la portion supérieure de cette étiquette. S'il n'y a pas d'odeur de gaz, passer à l'étape suivanté.
7. Pousse le levier du contrôle du gaz à "ON/MARCHE" position.
8. Remettre en place le panneau d'accés.
9. Mettre l'appareil sous tension.
10. Régler le thermostat à la température desirée.
11. Si l'appareil ne se met pas en marche, suiyre les instructions intitulées. Comment coupler l'admission de gaz de l'appereil et appeler un technicien qualifié ou le fourrnisseur de gaz.

TO TURN OFF GAS TO APPLIANCE

1. Set the thermostat to lowest setting.
2. Turn off all electric power to the appliance if service is to be performed.
3. Push the gas control lever to "OFF" Position. Do not force.
4. Replace control access panel.

POUR COUPER L'ADMISSION DE GAZ DE L'APPAREIL

1. Régler le thermostat à la température la plus basse.
2. Couper l'alimentation électrique de l'appareil s'il faut procéder à des opérations d'entretien.
3. Pousse le levier du contrôle du gaz à "OFF / ARRET" position. Ne pas forcer.
4. Remettre en place le panneau d'accès.

11072710

ACCESSORIES

Model Number	ASB01A	CVK4	CVK5	CVK6	CVK7	EAC5	EFR01	FFK03A	FTK03A	HAC1PS01	HAC1PS02	HAC1PS03	HAC1PS04	HAC1PS05	HAC1PS06	HAC1PS07	HAC1PS08	HAC1PS09	HAC1PS10	HAC1PS13	HAC1PS14	HALP09	HANG07	LPTK09	MAC1
Description	Adjustable Subbase	Common Vent Kit	Common Vent Kit	Common Vent Kit	Common Vent Kit	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	Propane Gas Conversion Kit	Media Air Cleaner
GUIA045A30		X	X	X	X	X	X	X	X	(2)												(2)	(2)	(3)	X
GUIA045B30		X	X	X	X	X	X	X	X	(2)												(2)	(2)	(3)	X
GUIA045CA30		X	X	X	X	X	X	X	X											(2)		(2)	(2)	(3)	X
GUIA070A30		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIA070B30		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIA070CA30		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIA070A40		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIA070B40		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIA070CA40		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIA090A30		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIA090B30		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIA090CA30		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIA090B50		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIA090CA50		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIA115A40		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIA115B40		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIA115CA40		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIA115A50		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIA115B50		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIA115CA50		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIA140A50		X	X	X	X	X	X	X	X				(1)	(4)								(2)	(2)	(3)	X
GUIA140B50		X	X	X	X	X	X	X	X				(1)	(4)								(2)	(2)	(3)	X
GUIA140CA50		X	X	X	X	X	X	X	X				(1)	(4)								(2)	(2)	(3)	X
GCIA045A30	X	X	X	X	X	X		X	X			(2)										(2)	(2)	(3)	X
GCIA045CX30	X	X	X	X	X	X		X	X												(2)	(2)	(2)	(3)	X
GCIA070A30	X	X	X	X	X	X		X	X							(2)						(2)	(2)	(3)	X
GCIA070CX30	X	X	X	X	X	X		X	X		(2)											(2)	(2)	(3)	X
GCIA070A40	X	X	X	X	X	X		X	X							(2)						(2)	(2)	(3)	X
GCIA070CX40	X	X	X	X	X	X		X	X		(2)											(2)	(2)	(3)	X
GCIA090A30	X	X	X	X	X	X		X	X								(2)					(2)	(2)	(3)	X
GCIA090CX30	X	X	X	X	X	X		X	X					(1)	(4)							(2)	(2)	(3)	X
GCIA090CX50	X	X	X	X	X	X		X	X					(1)	(4)							(2)	(2)	(3)	X
GCIA115A40	X	X	X	X	X	X		X	X									(1)	(4)			(2)	(2)	(3)	X
GCIA115CX40	X	X	X	X	X	X		X	X						(1)	(4)						(2)	(2)	(3)	X
GCIA115CX50	X	X	X	X	X	X		X	X						(1)	(4)						(2)	(2)	(3)	X
GCIA140A50	X	X	X	X	X	X		X	X						(1)	(4)						(2)	(2)	(3)	X
GCIA140CX50	X	X	X	X	X	X		X	X							(1)	(4)					(2)	(2)	(3)	X

X - Available for this model. (1) 7,501 to 9,500 ft. (3) 0 to 7,500 ft.

Not used in this application. (2) 7,501 to 11,000 ft. (4) 9,501 to 11,000 ft.

Note: All installations above 7,500 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

ACCESSORIES

Model Number	ASB01A	CVK4	CVK5	CVK6	CVK7	EAC5	EFR01	FFK03A	FTK03A	HAC1PS01	HAC1PS02	HAC1PS03	HAC1PS04	HAC1PS05	HAC1PS06	HAC1PS07	HAC1PS08	HAC1PS09	HAC1PS10	HAC1PS13	HAC1PS14	HALP09	HANG07	LPTK09	MAC1
Description	Adjustable Subbase	Common Vent Kit	Common Vent Kit	Common Vent Kit	Common Vent Kit	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	Propane Gas Conversion Kit	Media Air Cleaner
GUIB045A30		X	X	X	X	X	X	X	X	(2)												(2)	(2)	(3)	X
GUIB045B30		X	X	X	X	X	X	X	X	(2)												(2)	(2)	(3)	X
GUIB045CX30		X	X	X	X	X	X	X	X											(2)		(2)	(2)	(3)	X
GUIB070A30		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIB070B30		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIB070CX30		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIB070A40		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIB070B40		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIB070CX40		X	X	X	X	X	X	X	X		(2)											(2)	(2)	(3)	X
GUIB090A30		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIB090B30		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIB090CX30		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIB090A50		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIB090B50		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIB090CX50		X	X	X	X	X	X	X	X			(2)										(2)	(2)	(3)	X
GUIB115A40		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIB115CX40		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIB115A50		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIB115B50		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIB115CX50		X	X	X	X	X	X	X	X						(1)	(4)						(2)	(2)	(3)	X
GUIB140A50		X	X	X	X	X	X	X	X				(1)	(4)								(2)	(2)	(3)	X
GCIB045A30	X	X	X	X	X	X		X	X												(2)	(2)	(2)	(3)	X
GCIB070A30	X	X	X	X	X	X		X	X		(2)											(2)	(2)	(3)	X
GCIB070A40	X	X	X	X	X	X		X	X		(2)											(2)	(2)	(3)	X
GCIB090A30	X	X	X	X	X	X		X	X					(1)	(4)							(2)	(2)	(3)	X
GCIB090A50	X	X	X	X	X	X		X	X					(1)	(4)							(2)	(2)	(3)	X
GCIB115A40	X	X	X	X	X	X		X	X						(1)	(4)						(2)	(2)	(3)	X
GCIB115A50	X	X	X	X	X	X		X	X						(1)	(4)						(2)	(2)	(3)	X
GCIB140A50	X	X	X	X	X	X		X	X							(1)	(4)					(2)	(2)	(3)	X

X - Available for this model. (1) 7,501 to 9,500 ft. (3) 0 to 7,500 ft.

▭ Not used in this application. (2) 7,501 to 11,000 ft. (4) 9,501 to 11,000 ft.

Note: All installations above 7,500 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

ACCESSORIES

Model Number	CVK4	CVK5	CVK6	CVK7	EAC5	EFR01	FFK03A	FTK03A	HAC1PS11	HAC1PS12	HALP09	HANG07	LPLP01	LPTK09	MAC1
Description	Common Vent Kit	Common Vent Kit	Common Vent Kit	Common Vent Kit	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner
GUIC045CA30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC045CX30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC045DA30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC045DX30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070CA30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070CX30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070DA30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070DX30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070CA40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070DA40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070CX40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC070DX40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090CA30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090CX30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090DA30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090DX30	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090CA50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090CX50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090DA50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC090DX50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115CA40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115CX40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115DA40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115DX40	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115CA50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115CX50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115DA50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC115DX50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC140CA50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC140CX50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC140DA50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X
GUIC140DX50	X	X	X	X	X	X	X	X	(1)	(4)	(2)	(2)	X	(3)	X

X - Available for this model. (1) 6,001 to 8,500 ft. (3) 0 to 6,000 ft.

Not used in this application. (2) 6,001 to 11,000 ft. (4) 8,501 to 11,000 ft.

Note: All installations above 6,000 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

ACCESSORIES

Model Number	CVK4	CVK5	CVK6	CVK7	EAC5	EFR01	FFK03A	FTK03A	HAC1PS15	HALP12	HANG15	LPLP01	LPTK09	MAC1
Description	Common Vent Kit	Common Vent Kit	Common Vent Kit	Common Vent Kit	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Pressure Switch Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner
GUIC045EA30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC045EX30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070EA30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070EX30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070EA40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070EX40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC090EA50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC090EX50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115EA40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115EX40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115EA50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115EX50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC140EA50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC140EX50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC045FA30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC045FX30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070FA30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070FA40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070FX30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC070FX40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC090FA30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC090FA50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC090FX30	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC090FX50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115FA40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115FA50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115FX40	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC115FX50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC140FA50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X
GUIC140FX50	X	X	X	X	X	X	X	X	(3)	(2)	(2)	X	(1)	X

X - Available for this model. (1) 0 to 7,500 ft. (3) 4,501 to 11,000 ft.

Not used in this application. (2) 7,501 to 11,000 ft.

Note: All installations above 6,000 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

ACCESSORIES

Model Number	ASB01A	CVK4	CVK5	CVK6	CVK7	EAC5	EFR01	FFK03A	FTK03A	HAC1PS11	HAC1PS12	HALP09	HANG07	LPLP01	LPTK09	MAC1
Description	Adjustable Subbase	Common Vent Kit	Common Vent Kit	Common Vent Kit	Common Vent Kit	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner
GCIC045CX30	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC070CX30	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC070DX30	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC070CX40	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC070DX40	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC090CX30	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC090CX50	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC090DA50	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC115CX40	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC115CX50	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC140CX50	X	X	X	X	X	X		X	X	(1)	(4)	(2)	(2)	X	(3)	X
GCIC045FX30	X	X	X	X	X	X		X	X					X	(3)	X
GCIC070FX30	X	X	X	X	X	X		X	X					X	(3)	X
GCIC070FX40	X	X	X	X	X	X		X	X					X	(3)	X
GCIC090FX30	X	X	X	X	X	X		X	X					X	(3)	X
GCIC090FX50	X	X	X	X	X	X		X	X					X	(3)	X
GCIC090FX50	X	X	X	X	X	X		X	X					X	(3)	X
GCIC115FX40	X	X	X	X	X	X		X	X					X	(3)	X
GCIC115FX50	X	X	X	X	X	X		X	X					X	(3)	X
GCIC140FX50	X	X	X	X	X	X		X	X					X	(3)	X

X - Available for this model. (1) 6,001 to 8,500 ft. (3) 0 to 6,000 ft.

Not used in this application. (2) 6,001 to 11,000 ft. (4) 8,501 to 11,000 ft.

Note: All installations above 6,000 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

ACCESSORIES

Model Number	CVK4	CVK5	CVK6	CVK7	EAC5	EFR01	FFK03A	FTK03A	HAC1PS11	HAC1PS12	HAC1PS15	HALP07	HALP12	HANG07	HANG15	LPLP01	LPTK09	MAC1
Description	Common Vent Kit	Common Vent Kit	Common Vent Kit	Common Vent Kit	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Propane Gas Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner
GUID045CA30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID045CX30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID045DA30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID045DX30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070CA30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070CX30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070DA30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070DX30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070CA40	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070CX40	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070DA40	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070DX40	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090CA30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090CX30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090DA30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090DX30	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090CA50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090CX50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090DA50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID090DX50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID115CA50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID115CX50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID115DA50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID115DX50	X	X	X	X	X	X	X	X	(1)	(4)		(2)		(2)		X	(3)	X
GUID070EA30	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUID045GA30	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUID070GA30	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUID070GA40	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUID090GA30	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUID090GA50	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUID115GA50	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUIE045EX30	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUIE070EX40	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUIE090EX40	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUIE090EX50	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X
GUIE115EX50	X	X	X	X	X	X	X	X			(5)		(6)		(6)	X	(7)	X

X - Available for this model.
▭ Not used in this application.

(1) 6,001 to 8,500 ft.
(2) 6,001 to 11,000 ft.
(3) 0 to 6,000 ft.
(4) 8,501 to 11,000 ft.
(5) 4,501 to 11,000 ft.
(6) 7,501 to 11,000 ft
(7) 0 to 7,500 ft.

Note: All installations above 6,000 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

ACCESSORIES

Model Number	ASB01A	EAC5	EFR01	FFK03A	FTK03A	HALP09	HATS01	HATS02	HATS03	HATS04	HATS05	HATS06	HATS07	HATS08	HATS09	LPLP01	LPTK09	MAC1
Description	Adjustable Subbase	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	High Altitude Propane Gas Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	High Altitude Two-Stage Conversion Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner
GUIS070CX30		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIS070CA35		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIS070CX35		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIS070DA35		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIS070DX35		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIS090CA30		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090CX30		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090DA30		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090DX30		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090CA50		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090CX50		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090DA50		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS090DX50		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIS115CA50		X	X	X		(2)			(1)				(2)			X	(3)	X
GUIS115CX50		X	X	X		(2)			(1)				(2)			X	(3)	X
GUIS115DA50		X	X	X		(2)			(1)				(2)			X	(3)	X
GUIS115DX50		X	X	X		(2)			(1)				(2)			X	(3)	X
GUIS140CA50		X	X	X		(2)				(1)				(2)		X	(3)	X
GUIS140CX50		X	X	X		(2)				(1)				(2)		X	(3)	X
GUIS140DA50		X	X	X		(2)				(1)				(2)		X	(3)	X
GCIS070CX35	X	X		X		(2)					(1)				(2)	X	(3)	X
GCIS070DX35	X	X		X		(2)					(1)				(2)	X	(3)	X
GCIS090CX50	X	X		X		(2)					(1)				(2)	X	(3)	X
GCIS090DX50	X	X		X		(2)					(1)				(2)	X	(3)	X
GUIV070CX40		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIV070DX40		X	X	X		(2)	(1)					(2)				X	(3)	X
GUIV090CX50		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIV090DX50		X	X	X		(2)		(1)				(2)				X	(3)	X
GUIV115CX50		X	X	X		(2)			(1)				(2)			X	(3)	X
GUIV115DX50		X	X	X		(2)			(1)				(2)			X	(3)	X
GUIV140CX50		X	X	X		(2)				(1)				(2)		X	(3)	X
GUIV140DX50		X	X	X		(2)				(1)				(2)		X	(3)	X

X - Available for this model. (1) 3,001 to 7,000 ft. (3) 0 to 7,000 ft.

▭ Not used in this application. (2) 7,001 to 8,500 ft.

Note: All installations above 6,000 ft. require a pressure switch change.

Note: For installations in Canada the Amana 80% furnace is certified only to 4,500 ft.

Note: High Altitude Natural Gas Orifices are included in all HATS kits.

ACCESSORIES

Model Number	CFB16	CFB20	CFB24	DEHUM1	EAC5	EFR01	FFK03A	FTK03A	HCVK	HALP10	HALP11	HALP13	HANG11	HANG12	HANG13	HANG14	HANG16	HAPS27	HAPS28	HAPS29	HAPS30	HAPS31	LPLP01	LPTK09	MAC1	TSRK01	VCVK
Description	Counterflow Floor Base	Counterflow Floor Base	Counterflow Floor Base	Dehumidistat	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	Horizontal Concentric Vent Kit	High Altitude Propane Gas Kit	High Altitude Propane Gas Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner	Two-Stage Relay Kit	Vertical Concentric Vent Kit
GUCA045AX30					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA070AX30					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA070AX40					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA090AX40					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA090AX50					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA115AX50					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA045BX30					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA070BX30					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA070BX40					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA090BX40					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA090BX50					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GUCA115BX50					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GULA045AX30					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GULA070AX30					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GULA070AX40					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GULA090AX40					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GULA090AX50					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GULA115AX50					X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA045AX30	X				X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA070AX30	X				X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA070AX40		X			X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA090AX40		X			X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA090AX50			X		X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA115AX50			X		X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA045BX30	X				X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA070BX30	X				X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA070BX40		X			X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA090BX40		X			X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA090BX50			X		X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCCA115BX50			X		X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCLA070AX30	X				X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCLA070CX30	X				X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCLA090AX40		X			X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCLA090CX40		X			X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCLA115AX50			X		X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCLA115CX50			X		X	X	X	X	X	(2)			(1)	(4)				(2)					X	(3)	X		X
GCVA070AX40		X		X	X	X	X		X		(2)				(1)	(4)			(2)				X	(3)	X		X
GCVA090AX50			X	X	X	X	X		X		(2)				(1)	(4)				(2)			X	(3)	X		X
GCVA070BX40		X		X	X	X	X		X		(2)				(1)	(4)						(2)	X	(3)	X		X
GCVA090BX50			X	X	X	X	X		X		(2)				(1)	(4)						(2)	X	(3)	X		X
GUSA070BX35					X	X	X		X			(2)					(2)				(2)		X	(3)	X		X
GUSA090BX40					X	X	X		X			(2)					(2)				(2)		X	(3)	X		X
GUSA090BX50					X	X	X		X			(2)					(2)				(2)		X	(3)	X		X
GUSA115BX50					X	X	X		X			(2)					(2)				(2)		X	(3)	X		X

X - Available for this model (1) 7,001 to 9,000 ft. (3) 0 to 7,000 ft.

▭ Not used in this application. (2) 7,001 to 11,000 ft. (4) 9,001 to 11,000 ft.

Note: All installations above 7,000 ft. require a pressure switch change.

Note: For installations in Canada the Amana 90% furnace is certified only to 4,500 ft.

Note: The GUSA High Altitude Kits have not been determined to date. Information will be provided when received.

Note: GULA/GCLA are shipped non-direct vent but can be installed as direct vent by adding the intake air coupling and appropriate field supplied pipe.

ACCESSORIES

Model Number	CFB16	CFB20	CFB24	DEHUM1	EAC5	EFR01	FFK03A	FTK03A	HCVK	HALP10	HALP11	HANG11	HANG12	HANG13	HANG14	HAPS27	HAPS28	HAPS29	LPLP01	LPTK09	MAC1	TSRK01	VCVK
Description	Counterflow Floor Base	Counterflow Floor Base	Counterflow Floor Base	Dehumidistat	Electronic Air Cleaner	External Filter Rack	Fossil Fuel Kit	Furnace Twinning Kit	Horizontal Concentric Vent Kit	High Altitude Propane Gas Kit	High Altitude Propane Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Natural Gas Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	High Altitude Pressure Switch Kit	LP Gas Low Pressure Kit	Propane Gas Conversion Kit	Media Air Cleaner	Two-Stage Relay Kit	Vertical Concentric Vent Kit
GUVA045AX30				X	X	X	X		X		(2)			(1)	(4)		(2)		X	(3)	X	X	X
GUVA070AX40				X	X	X	X		X		(2)			(1)	(4)		(2)		X	(3)	X	X	X
GUVA090AX50				X	X	X	X		X		(2)			(1)	(4)			(2)	X	(3)	X	X	X
GUVA115AX50				X	X	X	X		X		(2)			(1)	(4)			(2)	X	(3)	X	X	X
GUVA045BX30				X	X	X	X		X		(2)			(1)	(4)		(2)		X	(3)	X		X
GUVA070BX40				X	X	X	X		X		(2)			(1)	(4)		(2)		X	(3)	X		X
GUVA090BX50				X	X	X	X		X		(2)			(1)	(4)			(2)	X	(3)	X		X
GUVA115BX50				X	X	X	X		X		(2)			(1)	(4)			(2)	X	(3)	X		X

X - Available for this model (1) 7,001 to 9,000 ft. (3) 0 to 7,000 ft.

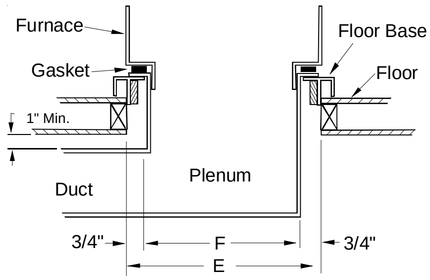
▭ Not used in this application. (2) 7,001 to 11,000 ft. (4) 9,001 to 11,000 ft.

Note: All installations above 7,000 ft. require a pressure switch change.

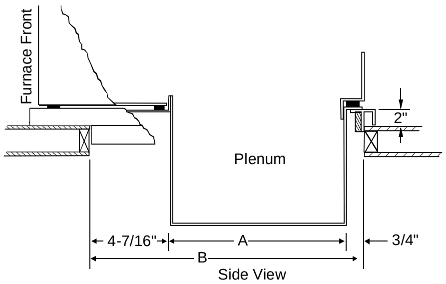
Note: For installations in Canada the Amana 90% furnace is certified only to 4,500 ft.

ACCESSORIES

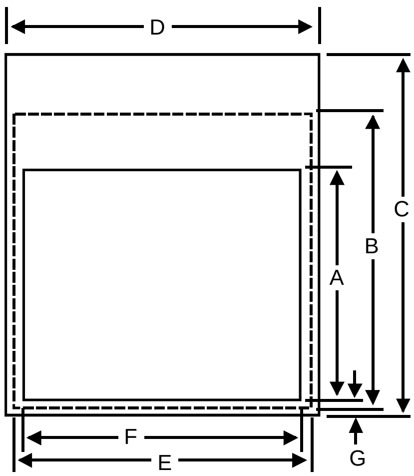
COUNTERFLOW FLOOR BASE



Front View



Side View



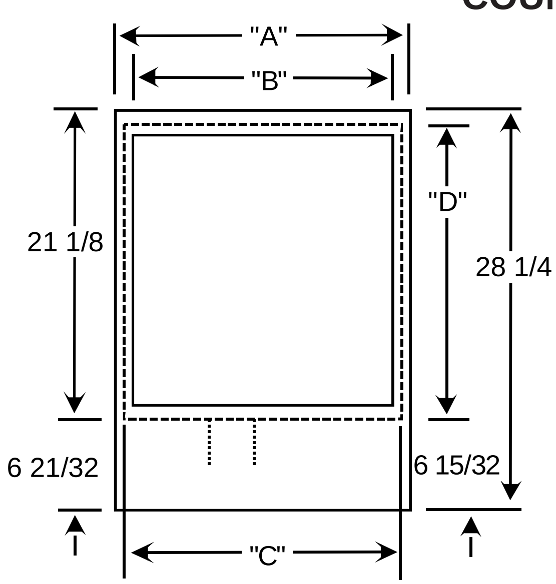
Floor Base Part Numbers	Used On Models	Floor Opening		Plenum Size	
		H	J	K	L
CFB16	GCCA045__30 GCCA070__30 GCLA045__30 GCLA070__30	16-1/2	23-3/4	15	18-9/16
CFB20	GCCA070__40 GCCA090__40 GCLA070__40 GCLA090__40	20-1/2	23-3/4	19	18-9/16
CFB24	GCCA090__50 GCCA115__50 GCLA090__50 GCLA115__50	24-1/2	23-3/4	23	18-9/16

All dimension are in inches.

Floor Base Part Numbers	Used On Models	A	B	C	D	E	F	G
CFB16	GCCA045__30 GCCA070__30 GCLA045__30 GCLA070__30	18-9/16	23-3/4	29	17-1/2	16-1/2	15	1-11/32
CFB20	GCCA070__40 GCCA090__40 GCLA070__40 GCLA090__40	18-9/16	23-3/4	29	21-1/2	20-1/2	19	1-11/32
CFB24	GCCA090__50 GCCA115__50 GCLA090__50 GCLA115__50	18-9/16	23-3/4	29	25-1/2	24-1/2	23	1-11/32

All dimension are in inches.

COUNTERFLOW SUBBASE

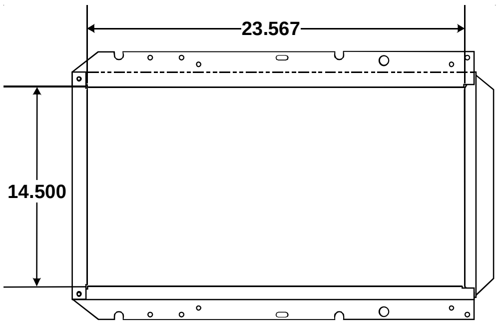


ASB01 or 01A SUBBASE DIMENSIONS				
Furnace Model	Dim. "A" Subbase Width	Dim. "B" Plenum Chamber	Dim. "C" Floor Opening	Dim. "D" Floor Opening
GCI_070	17	15	16-1/8	21-1/4
GCI_090	21	19	20-1/8	21-1/4
GCI_115 GCI_140	25	23	24-1/8	21-1/4

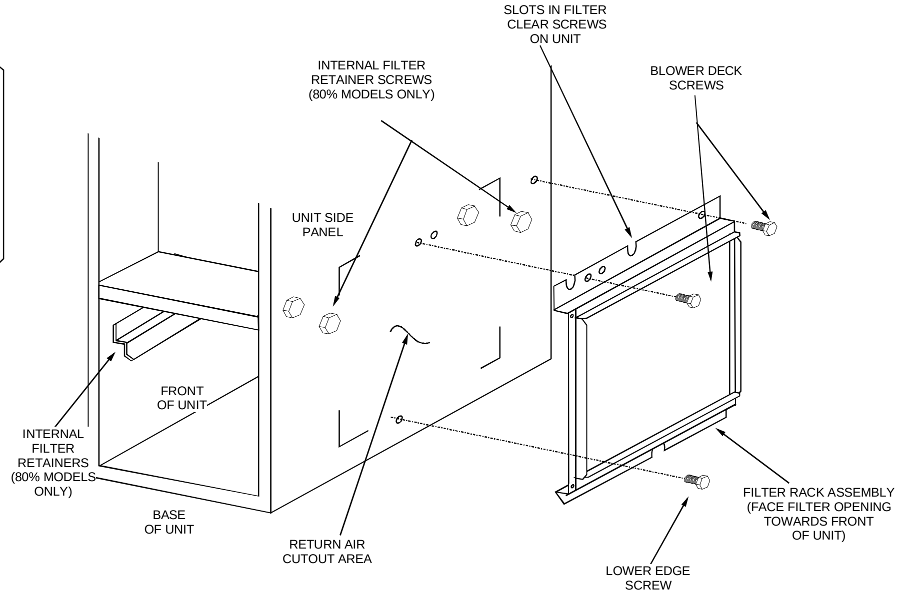
All dimensions given in inches.
Subbase adjustable to fit all 3 cabinet sizes.
Detailed installation instructions ship with the subbase.

ACCESSORIES

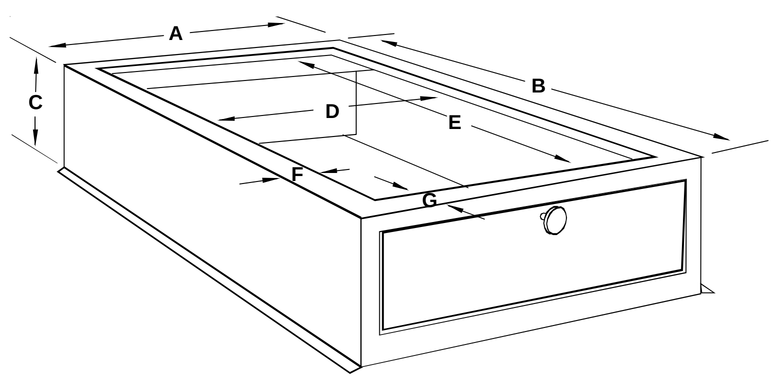
EXTERNAL FILTER RACK KIT



EFR01 EXTERNAL FILTER RACK KIT
Used on Models
80% Upflow Model Furnaces
90% Upflow Model Furnaces



ACCOMODATOR FILTER HOUSING



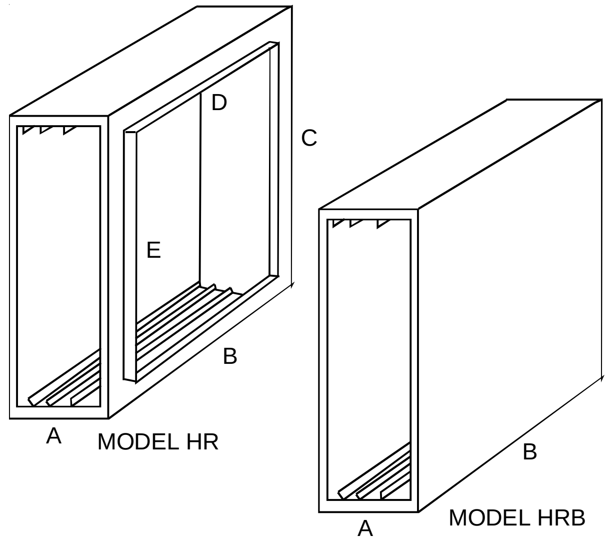
ACG1625-3/6, ACG2025-3/6 & ACG2424-3/6 ACCOMODATOR FILTER HOUSING
Used on Models
80% Furnaces
90% Furnaces

ACCOMODATOR FILTER HOUSING DIMENSIONS								
Model Number	Overall			Opening		Top		Filter Size
	A	B	C	D	E	F	G	
ACG1625-3	17-3/8	28-3/8	3-3/4	14-7/8	26	1-1/2	1	16x25
ACG1625-6	17-3/8	28-3/8	5-3/4	14-7/8	26	1-1/2	1	16x25
ACG2025-3	21-3/8	28-3/8	3-3/4	18-7/8	26	1-1/2	1	20x25
ACG2025-6	21-3/8	28-3/8	5-3/4	18-7/8	26	1-1/2	1	20x25
ACG2424-3	25-3/8	28-3/8	3-3/4	18-7/8	26	1-1/2	1	24x24
ACG2424-6	25-3/8	28-3/8	5-3/4	18-7/8	26	1-1/2	1	24x24

All dimensions given in inches.
Short base handles 1" & 2" filters. Height 3-3/4".
Tall base handles 1", 2" & 4" filters. Height 5-3/4".

ACCESSORIES

HORIZONTAL FILTER HOUSING



HORIZONTAL FILTER HOUSING DIMENSIONS						
Model Number	Overall			Duct Opening		Filter Size
	A	B	C	D	E	
HR20	6-5/8	25-1/2	22	19-3/4	19	20x25
HR25	6-5/8	20-1/2	27	19-3/4	19	20x25

All dimensions given in inches.
Uses Standard Filter Sizes: 1", 2" or 4".

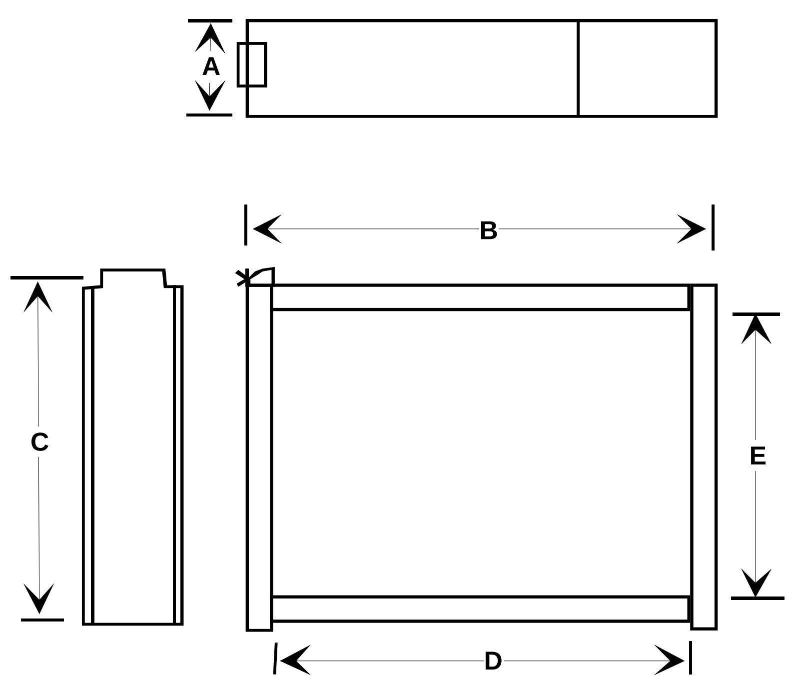
HR20 & HR25 HORIZONTAL FILTER HOUSING
Used on Models
80% Upflow Furnaces
90% Upflow Furnaces

MEDIA AIR CLEANER

MAC1 SPECIFICATIONS	
CAPACITY	600-2000CFM
MEDIA SERVICE LIFE	12 MO.NOMINAL
MEDIA LISTING	UL CLASS 2
DIMENSIONS	
A	7-1/4
B	25
C	22-1/8
D	22-5/8
E	17-11/16
RESISTANCE	
CFM	**INCHES W.C.**
600	.04
800	.05
1000	.09
1200	.12
1400	.15
1600	.18
1800	.22
2000	.27

All dimensions are in inches.

MEDIA AIR CLEANER
Used On Models
80% Furnaces
90% Furnaces



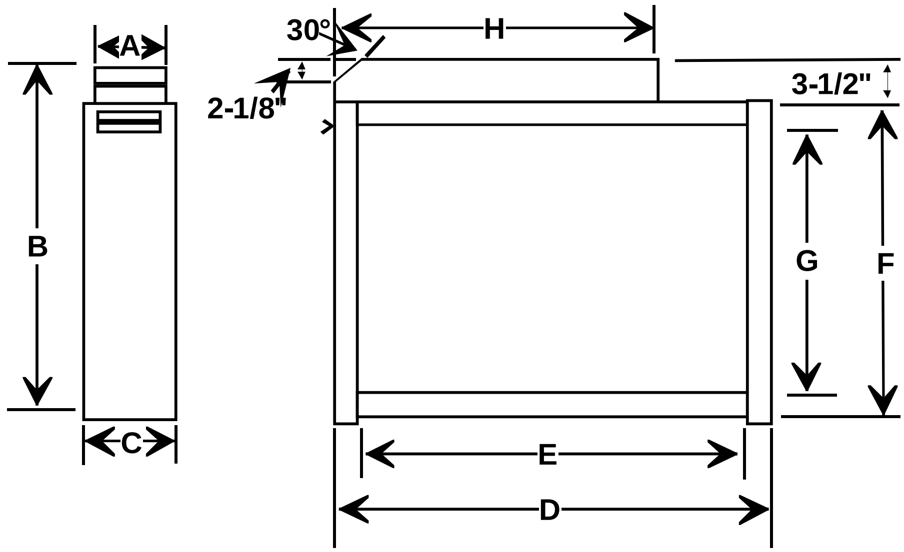
ACCESSORIES

ELECTRONIC AIR CLEANER

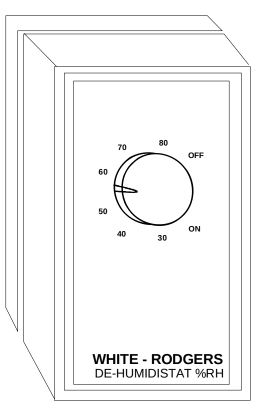
EAC5 SPECIFICATIONS	
RATED CAPACITY	2000 CFM (3400 M^3/HR)
MAX. PRESSURE	.13 in. w.g. @ 2000 CFM
CELL WEIGHT	(2) 12 lbs. each
UNIT WEIGHT	46 lbs.
POWER	48 watts maximum
ELECTRICAL INPUT	120 V , 60 HZ, 1 PH
ELECTRICAL	3.2 MA @ 6200 VDC
DIMENSIONS	
A	4-1/2
B	24-7/16
C	7-3/16
D	25
E	20-5/16
F	20-3/4
G	22-1/2
H	17-3/4

All dimensions are in inches.

EAC5 ELECTRONIC AIR CLEANER
Used on Models
80% Furnaces
90% Furnaces



DEHUMIDISTAT

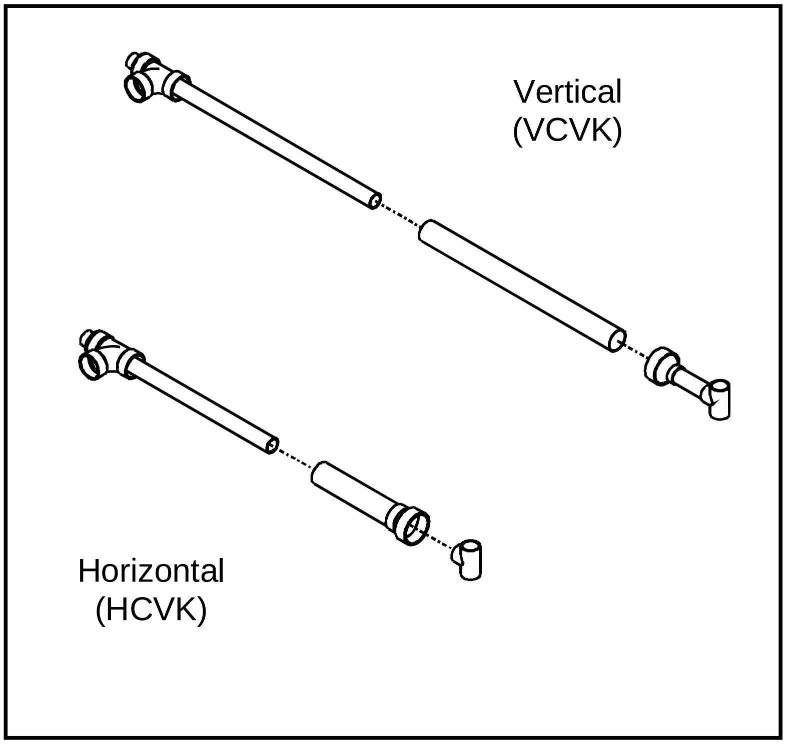


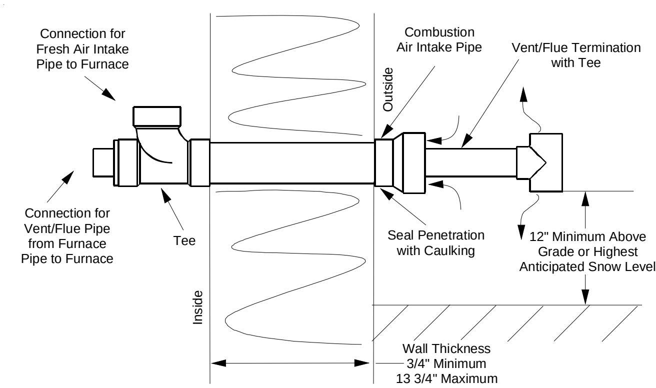
DEHUM1 DEHUMIDISTAT SPECIFICATIONS	
Model Number	2274W-21
Setpoint - Humidity Range	30% to 80% RH
Operating Ambient	10° to 40° C (50° to 104° F)
Differential	5%
Volts	24
Amps	1
HZ	60

DEHUM1 DEHUMIDISTAT
Used on Models
GUIV
GUVA
GCVA

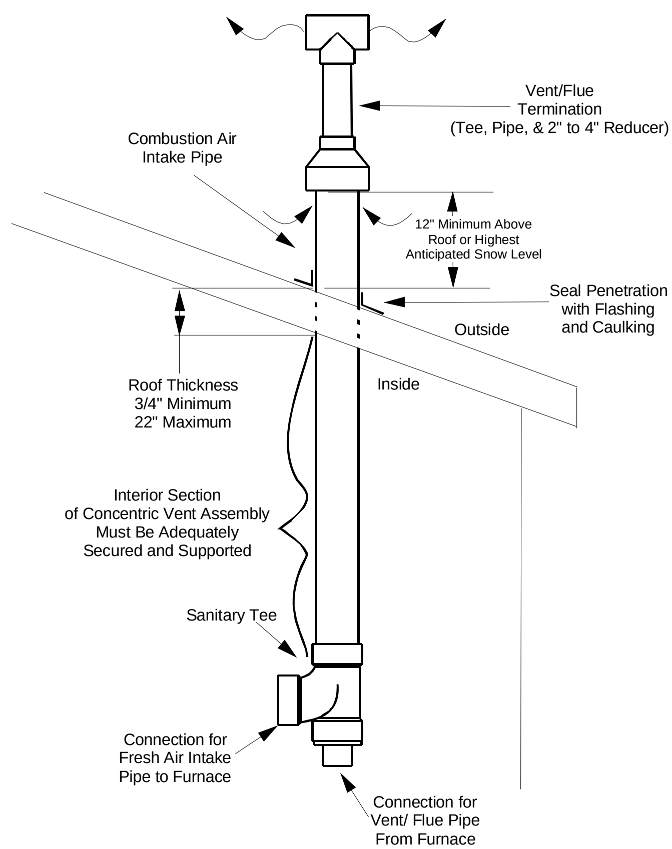
ACCESSORIES

CONCENTRIC VENT CONVERSION KIT





HVCK Installation



VCVK Installation

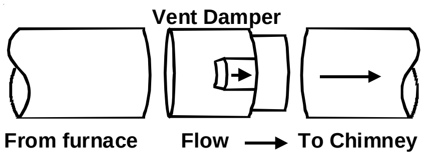
Concentric Vents Kits HVCK and VCVK are suitable for use with the following Amana 90% efficient furnace products:

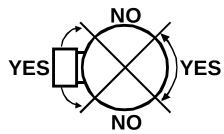
CONCENTRIC VENT KIT
Used On Models
GUCA / GCCA
GUVA / GCVA
GUSA
GULA
GCLA
GCVA

This kit is not certified for, and must not be applied to any furnace not listed in the above table.

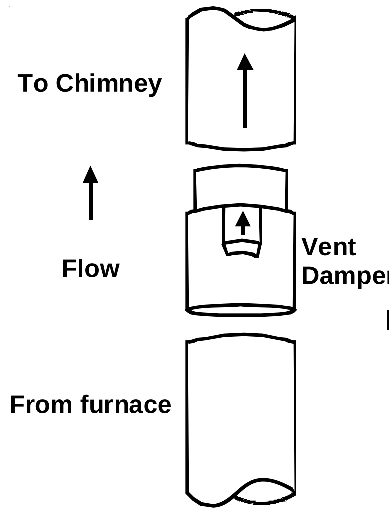
ACCESSORIES

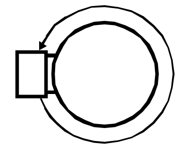
COMMON VENT KIT





Install vent damper with actuator to sides of vent only. Do not mount vent damper with actuator above or below the vent.





Install vent damper with actuator in any position.

Horizontal Vent Installation

CVK4-7 COMMON VENT KITS	
Kit Model Numbers	**Vent Diameter Inches**
CVK 4	4
CVK 5	5
CVK 6	6
CVK 7	7

Vertical Vent Installation

CVK4-7 COMMON VENT KITS	
Used on Models	
GUIA	GCIA
GUIB	GCIB
GUIC	GCIC
GUID	

PRODUCT DESIGN

Safety

Please adhere to the following warnings and cautions when installing, adjusting, altering, servicing, or operating the furnace.

WARNING

TO PREVENT PERSONAL INJURY OR DEATH DUE TO IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE, REFER TO THIS MANUAL. FOR ADDITIONAL ASSISTANCE OR INFORMATION, CONSULT A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

WARNING

THIS PRODUCT CONTAINS OR PRODUCES A CHEMICAL(S) WHICH MAY CAUSE DEATH OR SERIOUS ILLNESS AND WHICH ARE KNOWN BY THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

WARNING

TO PREVENT POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO ELECTRICAL SHOCK, THE FURNACE MUST BE LOCATED TO PROTECT THE ELECTRICAL COMPONENTS FROM WATER.

This furnace may be used as a construction site heater **ONLY** if the following conditions are met:

- The vent system is permanently installed per these installation instructions.
- A room thermostat is used to control the furnace. Fixed jumpers that provide continuous heating CANNOT be used.
- Return air ducts are provided and sealed to the furnace.
- A return air temperature range between 60ºF (16ºC) and 80ºF (27ºC) is maintained.
- Air filters are installed in the system and maintained during construction, replaced as appropriate during construction, and upon completion of construction are replaced.• The input rate and temperature rise are set per the furnace rating plate.
- The input rate and temperature rise are set per the furnace rating plate.
- 100% outside air is provided for combustion air requirements during construction. Temporary ducting can be used.

  NOTE: Do not connect the temporary duct directly to the furnace. The duct must be sized according to the instructions under *Section V, Combustion and Ventilation Air Requirements, Section 5.3.3.*
- The furnace heat exchanger, components, duct system, air filters and evaporator coils are thoroughly cleaned following final construction clean up.
- All furnace operating conditions (including ignition, input rate, temperature rise and venting) are verified according to these installation instructions.

NOTE: The Commonwealth of Massachusetts requires that the following additional requirements must also be met:

- Gas furnaces must be installed by a licensed plumber or gas fitter.
- A T-handle gas cock must be used.
- If the unit is to be installed in an attic, the passageway to and the service area around the unit must have flooring.

To ensure proper installation and operation, thoroughly read this manual for specifics pertaining to the installation and application of this product.

WARNING

POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO FIRE, EXPLOSION, SMOKE, SOOT, CONDENSTAION, ELECTRICAL SHOCK OR CARBON MONOXIDE MAY RESULT FROM IMPROPER INSTALLATION, REPAIR, OPERATION, OR MAINTENANCE OF THIS PRODUCT.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS

NOTE: Discharge body's static electricity before touching unit. An electrostatic discharge can adversely affect electrical components.

Use the following precautions during furnace installation and servicing to protect the integrated control module from damage. By putting the furnace, the control, and the person at the same electrostatic potential, these steps will help avoid exposing the integrated control module to electrostatic discharge. This procedure is applicable to both installed and uninstalled (ungrounded) furnaces.

1. Disconnect all power to the furnace. Do not touch the integrated control module or any wire connected to the control prior to discharging your body's electrostatic charge to ground.
2. Firmly touch a clean, unpainted, metal surface of the furnace near the control. Any tools held in a person's hand during grounding will be discharged.
3. Service integrated control module or connecting wiring following the discharge process in Step 2. Use caution not to recharge your body with static electricity; (i.e., do not move or shuffle your feet, do not touch ungrounded objects, etc.). If you come in contact with an ungrounded object, repeat Step 2 before touching control or wires.
4. Discharge any static electricity from your body to ground before removing a new control from its container. Follow Steps 1 through 3 if installing the control on a furnace. Return any old or new controls to their containers before touching any ungrounded object.

PRODUCT DESIGN

Product Application

This product is designed for use as a residential home gas furnace. It is **not** designed or certified for use in mobile home, trailer, recreational vehicle, or commercial applications.

The 80% and 90% furnaces are CSA certified appliances and are appropriate for use with natural or propane gas. (**NOTE:** If using propane gas, a propane conversion kit is required).

One important difference between the 80% and 90% furnace is that the 90% furnace is a dual certified appliance.

Dual certification means that the combustion air inlet pipe is optional and the furnace can be vented as a:

Non-direct vent (single pipe) central forced air furnace in which combustion air is taken from the installation area or from air ducted from the outside or,

Direct vent (dual pipe) central forced air furnace in which all combustion air supplied directly to the furnace burners through a special air intake system outlined in this manual and the installation instructions.

IMPORTANT NOTE: The 80% furnace cannot be installed as a direct vent furnace. The burner box is present only to help reduce sound transmission from the burners to the occupied space.

To ensure proper installation, operation and servicing, thoroughly read the installation and service manuals for specifics pertaining to the installation, servicing and application of this product.

WARNING

POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO FIRE, EXPLOSION, SMOKE, SOOT, CONDENSATION, ELECTRICAL SHOCK OR CARBON MONOXIDE MAY RESULT FROM IMPROPER INSTALLATION, REPAIR, OPERATION, OR MAINTENANCE OF THIS PRODUCT.

WARNING

TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY OR DEATH DUE TO FIRE, DO NO INSTALL THIS FURNACE IN A MOBILE HOME, TRAILER, OR RECREATIONAL VEHICLE.

To ensure proper furnace operation, install, operate, maintain and service the furnace in accordance with the installation, operation and service instructions, all local building codes and ordinances. In their absence, follow the latest edition of the National Fuel Gas Code (NFPA 54/ANSI Z223.1), and/or CAN/CGA B149 Installation Codes, local plumbing or waste water codes, and other applicable codes.

A copy of the National Fuel Gas Code (NFPA 54/ANSI Z223.1) can be obtained from any of the following:

American National Standards Institute
1430 Broadway
New York, NY 10018

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02269

CSA International
8501 East Pleasant Valley
Cleveland, OH 44131

A copy of the CAN/CGA B149 Installation Codes can be obtained from:

CSA International
178 Rexdale Boulevard
Etobicoke, Ontario, Canada M9W, 1R3

The rated heating capacity of the furnace should be greater than or equal to the total heat loss of the area to be heated. The total heat loss should be calculated by an approved method or in accordance with "ASHRAE Guide" or "Manual J-Load Calculations" published by the Air Conditioning Contractors of America.

Location Requirements and Considerations

WARNING

TO PREVENT POSSIBLE EQUIPMENT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH, THE FOLLOWING BULLET POINTS MUST BE OBSERVED WHEN INSTALLING THE UNIT.

Follow the instructions listed below when selecting a furnace location. Refer also to the provided in the *Combustion and Ventilation Air Requirements* section in this manual or the installation instructions for details.

- Centrally locate the furnace with respect to the proposed or existing air distribution system.
- Ensure the temperature of the return air entering the furnace is between 55°F and 100°F when the furnace is heating.
- Provide provisions for venting combustion products outdoors through a proper venting system. Special consideration should be given to vent/flue pipe routing and combustion air intake pipe when applicable.

  80% Furnaces: All installations must be vented in accordance with National Fuel Gas Code, NFPA 54/ ANSI Z223.1 - lateset edition. In Canada the furnaces must be vented in accordance with the National Standard of Canada, CAN/CGA B149. **NOTE:** Also for the installers use, Amana® brand ships a Category I Two Stage Venting Manual with each two-stage 80% furnace.

90% Furnaces: Refer to the *Vent/Flue Pipe and Combustion Air Pipe -Termination Locations* section in this manual or the installation instructions for appropriate termination locations. Also for 90% furnaces, refer to the *Vent/Flue Pipe and Combustion Air Pipe -Termination Locations* section in this manual or the installation instructions to determine if the piping system from furnace to termination can be accomplished within the guidelines given**. NOTE:** The length of flue and/or combustion air piping can be a limiting factor in the location of the furnace.

- Locate the 90% furnace so that the condensate can be piped at a downward slope away from the furnace to the drain. Do not locate the furnace or its condensate drainage system in any area subject to below freezing temperatures without proper freeze protection. Refer to the *Condensate Drain Lines and Trap* section in this manual or the installations instructions for further details.
- Set the 90% furnace on a level floor to enable proper condensate drainage. If the floor becomes wet or damp at times, place the furnace above the floor on a concrete base sized approximately 1-1/2" larger than the base of the furnace. Refer to the *Horizontal Applications and Considerations* section in this manual or the installation instructions for leveling of horizontal furnaces.
- Ensure upflow or horizontal furnaces are not installed directly on carpeting, or any other combustible material. The only combustible material allowed is wood.
- A special accessory subbase must be used for upright counterflow unit installations over any combustible material (including wood). Refer to subbase instructions for installation details. (**NOTE:** A subbase will not be required if an air conditioning coil is located beneath the furnace between the supply air opening and the combustible floor.
- Exposure to contaminated combustion air will result in safety and performance-related problems. Do not install the furnace where the combustion air is exposed to the following substances:

  chlorinated waxes or cleaners

  chlorine-based swimming pool chemicals

  water softening chemicals

  deicing salts or chemicals

  carbon tetrachloride

  halogen type refrigerants

  cleaning solutions (such as perchloroethylene)

  printing inks

  paint removers

  varnishes

  hydrochloric acid

  cements and glues

  antistatic fabric softeners for clothes dryers

  and masonry acid washing materials

- Seal off a *non-direct vent* furnace if it is installed near an area frequently contaminated by any of the above substances. This protects the *non-direct vent* furnace from airborne contaminants. To ensure that the enclosed *non-direct vent* furnace has an adequate supply of combustion air, vent from a nearby uncontaminated room or from outdoors. Refer to the *Combustion and Ventilation Air Requirements* section in this manual or the installation instructions for details.
- If the furnace is used in connection with a cooling unit, install the furnace upstream or in parallel with the cooling unit coil. Premature heat exchanger failure will result if the cooling unit coil is placed ahead of the furnace.
- If the furnace is installed in a residential garage, position the furnace so that the burners and ignition source are located not less than 18 inches (457 mm) above the floor. Protect the furnace from physical damage by vehicles.
- If the furnace is installed horizontally, the furnace access doors must be vertical so that the burners fire horizontally into the heat exchanger. Do not install the unit with the access doors on the “up/top” or “down/bottom” side of the furnace.

CLEARANCES AND ACCESSIBILITY

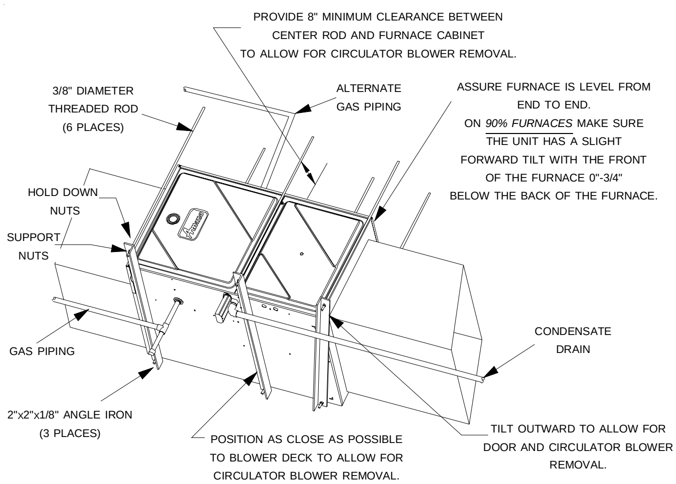
Installations must adhere to the clearances to combustible materials to which this furnace has been design certified. The minimum clearance information for this furnace is provided on the unit’s clearance label. These clearances must be permanently maintained. Refer to Specification Sheet for minimum clearances to combustible materials. Clearances must also accommodate an installation’s gas, electrical, and drain trap and drain line connections. If the alternate combustion air intake or vent/flue connections are used on a 90% furnace, additional clearances must be provided to accommodate these connections. Refer to *Vent Flue Pipe and Combustion Air Pipe* section in this manual or the installation instructions for details. **NOTE:** In addition to the required clearances to combustible materials, a minimum of 36 inches service clearance must be available in front of the unit.

A furnace installed in a confined space (i.e., a closet or utility room) must have two ventilation openings with a total minimum free area of 0.25 square inches per 1,000 BTU/hr of furnace input rating. One of the ventilation openings must be within 12 inches of the top; the other opening must be within 12 inches of the bottom of the confined space. In a typical construction, the clearance between the door and door frame is usually adequate to satisfy this ventilation requirement.

PRODUCT DESIGN

FURNACE SUSPENSION

If suspending the furnace from rafters or joist, use 3/8" threaded rod and 2”x2”x1/8” angle iron as shown in the following figure. If the furnace is installed in a crawl space it must also be suspended from the floor joist or supported by a concrete pad. Never install the furnace on the ground or allow it to be exposed to water. The length of rod will depend on the application and the clearances necessary.



90% Suspended Furnace Shown
(80% Furnace Similar)

EXISTING FURNACE REMOVAL

NOTE: When an existing furnace is removed from a venting system serving other appliances, the venting system may be too large to properly vent the remaining attached appliances.

The following vent testing procedure is reproduced from the **American National Standard/National Standard of Canada for Gas-Fired Central Furnaces ANSI Z21.47-1998, CAN/CGA-2.3-M98 Section 1.23.1.**

The following steps shall be followed with each appliance connected to the venting system placed in operation, while any other appliances connected to the venting system are not in operation:

a. Seal any unused openings in the venting system;

b. Inspect the venting system for proper size and horizontal pitch, as required by the National Fuel Gas Code, ANSI Z223.1 or the CAN/CGA B149 Installation Codes and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies which could cause an unsafe condition;

c. In so far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building. Turn on clothes dryers and any appliance not connected to the venting system. Turn on any exhaust fans, such as range hoods and bathroom exhausts, so they shall operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers;

d. Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so appliance shall operate continuously;

e. Test for draft hood equipped appliance spillage at the draft hood relief opening after 5 minutes of main burner operation. Use the flame of a match or candle;

f. After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas burning appliance to their previous conditions of use;

g. If improper venting is observed during any of the above tests, the common venting system must be corrected.

Corrections must be in accordance with the latest edition of the National Fuel Gas Code NFPA 54/ANSI Z223.1 and/or CAN/CGA B149 Installation Codes.

If resizing is required on any portion of the venting system, use the appropriate table in Appendix G in the latest edition of the National Fuel Gas Code ANSI Z223.1 and/or CAN/CGA B149 Installation Codes.

THERMOSTAT REQUIREMENTS

A single-stage furnace requires a single-stage thermostat while the two-stage furnace requires a two-stage thermostat for proper operation. The single-stage thermostat provides "W1" for only one stage of heat while the two-stage thermostat provides "W1" and a "W2" terminals for control of low stage and high stage heat. Refer to *Electrical Connections - 24 Volt Thermostat Wiring* section in this manual or the installation instructions for correct installation procedure for these thermostats.

NOTE: A single-stage thermostat can be used with the two-stage furnace models GUIS,GCIS, GUIV and GUVA-AX, if a Two-Stage Relay Kit (TSRK01) is installed. The TSRK01 does not offer “true” thermostat-driven two-stage operation. It does, however, provide a timed transition from low to high fire. For complete details on the TSRK01 refer to installation instructions provided with the kit.

NOTE: The *GUVA-BX* and *GUSA-BX, GUIS-FX, GCIS-FX GUIV-FX* model furnaces do not require the use of the Two-Stage Relay Kit (TSRK01) for use with a single stage thermostat. These units have a thermostat jumper pin selector on the control board for selecting the use of either a single stage or two stage thermostat.

DEHUMIDISTAT REQUIREMENTS

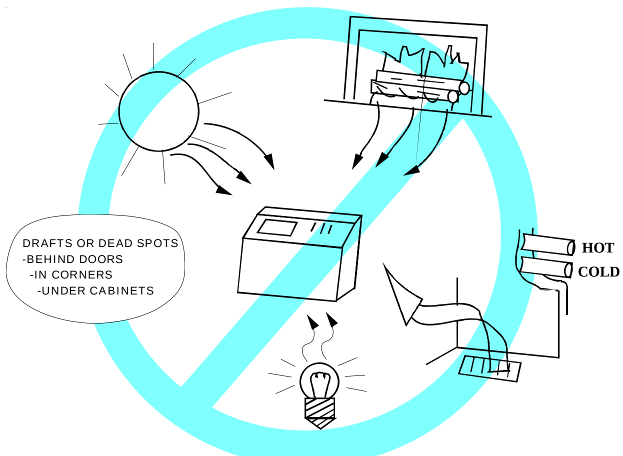
A dehumidistat can be used in conjunction with either the two-stage 80% or 90% furnaces with variable speed circulator blowers to lower the humidity in the conditioned space. The dehumidistat will improve dehumidification of the conditioned air by prompting the furnace to reduce the speed of the circulator blower during operation in the cooling mode. To be compatible with these furnaces, a dehumidistat must operate on 24 VAC and utilize a switch which *opens on humidity rise.* Refer to *Electrical Connections - 24 Volt Dehumidistat Wiring* section in this manual or the installation instructions for correct installation procedure.

PRODUCT DESIGN

THERMOSTAT AND DEHUMIDISTAT LOCATION

In an area having good air circulation, locate the thermostat and dehumidistat (if applicable) about five feet high on a vibration-free inside wall. Do not install the thermostat or dehumidistat where it may be influenced by any of the following:

- Drafts, or dead spots behind doors, in corners, or under cabinets.
- Hot or cold air from registers.
- Radiant heat from the sun.
- Light fixtures or other appliances.
- Radiant heat from a fireplace.
- Concealed hot or cold water pipes, or chimneys.
- Unconditioned areas behind the thermostat and dehumidistat, such as an outside wall.



Thermostat Influences

Consult the instructions packaged with the thermostat and dehumidistat for mounting instructions and further precautions.

Combustion and Ventilation Air Requirements

> **⚠ WARNING**
>
> **POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH MAY OCCUR IF THE FURNACE IS NOT PROVIDED WITH ENOUGH FRESH AIR FOR PROPER COMBUSTION AND VENTILATION OF FLUE GASES. MOST HOMES REQUIRE OUTSIDE AIR TO BE SUPPLIED TO THE FURNACE AREA.**

Improved construction and additional insulation in buildings have reduced heat loss by reducing air infiltration and escape around doors and windows. These changes have helped in reducing heating/cooling costs but have created a problem supplying combustion and ventilation air for gas fired and other fuel burning appliances. Appliances that pull air out of the house (clothes dryers, exhaust fans, fireplaces, etc.) increase the problem by starving appliances for air.

If this furnace is to be installed in the same space with other gas appliances, such as a water heater, ensure there is an adequate supply of combustion and ventilation air for the other appliances. Refer to the latest edition of the National Fuel Gas Code NFPA 54/ANSI Z223.1 (Section 5.3), or CAN/CGA B149 Installation Codes (Sections 7.2, 7.3, or 7.4), or applicable provisions of the local building codes for determining the combustion air requirements for the appliances.

Most homes will require outside air be supplied to the furnace area by means of ventilation grilles or ducts connecting directly to the outdoors or spaces open to the outdoors such as attics or crawl spaces.

The following information on air for combustion and ventilation is reproduced from the **National Fuel Gas Code NFPA 54/ANSI Z223.1 Section 5.3.**

5.3.1 General:

(a) The provisions of 5.3 apply to gas utilization equipment installed in buildings and which require air for combustion, ventilation and dilution of flue gases from within the building. They do not apply to (1) direct vent equipment which is constructed and installed so that all air for combustion is obtained from the outside atmosphere and all flue gases are discharged to the outside atmosphere, or (2) enclosed furnaces which incorporate an integral total enclosure and use only outside air for combustion and dilution of flue gases.

(b) Equipment shall be installed in a location in which the facilities for ventilation permit satisfactory combustion of gas, proper venting and the maintenance of ambient temperature at safe limits under normal conditions of use. Equipment shall be located so as not to interfere with proper circulation of air. When normal infiltration does not provide the necessary air, outside air shall be introduced.

(c) In addition to air needed for combustion, process air shall be provided as required for: cooling of equipment or material, controlling dew point, heating, drying, oxidation or dilution, safety exhaust, odor control, and air for compressors.

(d) In addition to air needed for combustion, air shall be supplied for ventilation, including all air required for comfort and proper working conditions for personnel.

(e) A draft hood or a barometric draft regulator shall be installed in the same room as the equipment served so as to prevent any difference in pressure between the hood or regulator and the combustion air supply.

(f) While all forms of building construction cannot be covered in detail, air for combustion, ventilation and dilution of flue gases for gas utilization equipment vented by natural draft normally may be obtained by application of one of the methods covered in 5.3.3 and 5.3.4.

(g) Air requirements for the operation of exhaust fans, kitchen ventilation systems, clothes dryers, and fireplaces shall be considered in determining the adequacy of a space to provide combustion air requirements.

5.3.2 Equipment Located in Unconfined Spaces:

In unconfined spaces (see definition below) in buildings, infiltration may be adequate to provide air for combustion ventilation and dilution of flue gases. However, in buildings of tight construction (for example, weather stripping, heavily insulated, caulked, vapor barrier, etc.), additional air may need to be provided using the methods described in 5.3.3-b or 5.3.4.

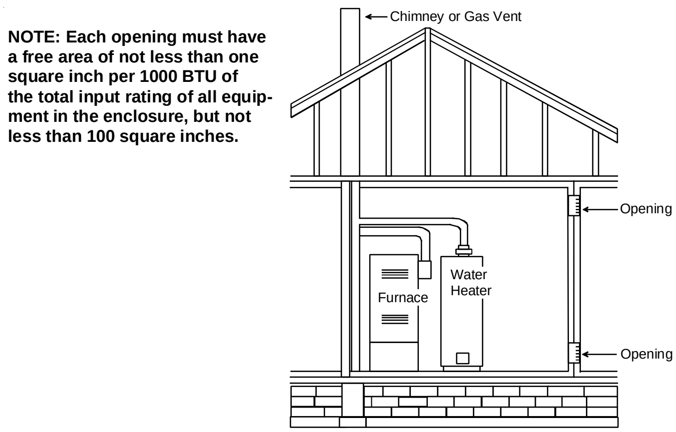
PRODUCT DESIGN

Space, Unconfined.

For purposes of this Code, a space whose volume is not less than 50 cubic feet per 1,000 BTU per hour of the aggregate input rating of all appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed through openings not furnished with doors, are considered a part of the unconfined space.

5.3.3 Equipment Located in Confined Spaces:

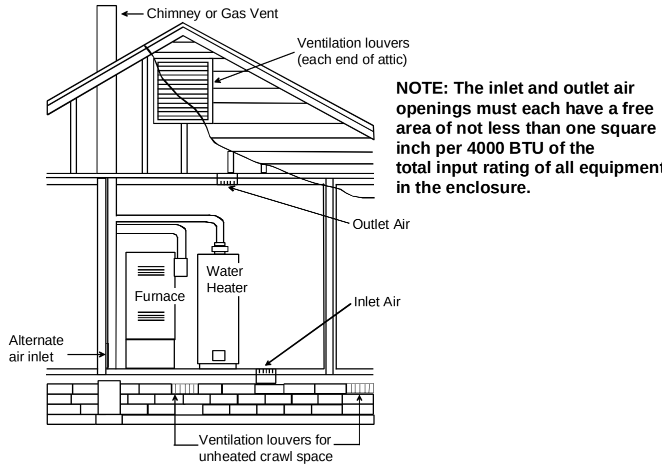
(a) *All Air from Inside the Building:* The confined space shall be provided with two permanent openings communicating directly with other spaces of sufficient volume so that the combined volume of all spaces meets the criteria for an unconfined space. The total input of all gas utilization equipment installed in the combined space shall be used to determine the required minimum volume. Each opening shall have a minimum free area of 1 square inch per 1,000 BTU per hour of the total input rating of all gas utilization equipment in the confined space, but not less than 100 square inches. One opening shall be within 12 inches of the top and one within 12 inches of the bottom of the enclosure. The minimum dimension of air openings shall not be less than 3 inches.



Equipment Located in Confined Spaces; All Air from Inside Building. See 5.3.3-a.

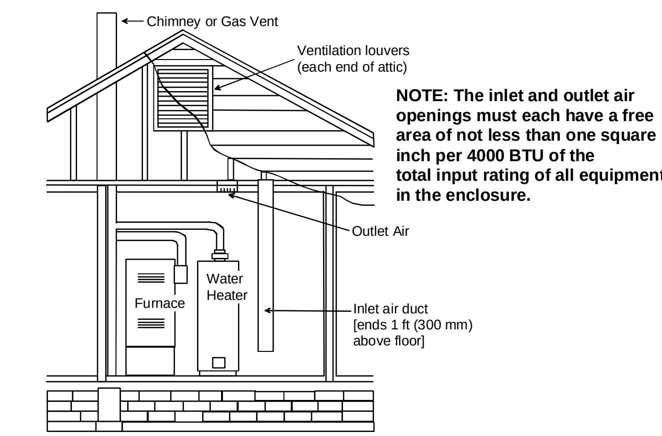
(b) *All Air from Outdoors:* The confined space shall communicate with the outdoors in accordance with one of the following two methods: **Two permanent openings**, one commencing within 12 inches of the top and one commencing within 12 inches of the bottom of the enclosure or **One permanent opening,** commencing within 12 inches of the top of the enclosure where the equipment has clearances of at least 1 inch from the sides and back and 6 inches from the front of the appliance. The openings shall communicate directly, or by ducts, with the outdoors or spaces (crawl or attic) that freely communicate with the outdoors.

1. When directly communicating with the outdoors, each open ing shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure.



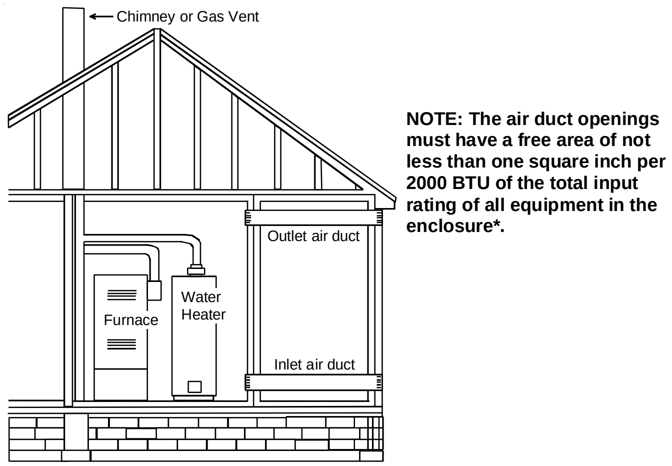
Equipment Located in Confined Spaces; All Air from Outdoors—Inlet Air from Ventilated Crawl Space and Outlet Air to Ventilated Attic. See 5.3.3-b

2. When communicating with the outdoors through vertical ducts, each opening shall have a minimum free area of 1 square inch per 4,000 BTU per hour of total input rating of all equipment in the enclosure.



Equipment Located in Confined Spaces; All Air from Outdoors Through Ventilated Attic. See 5.3.3-b.

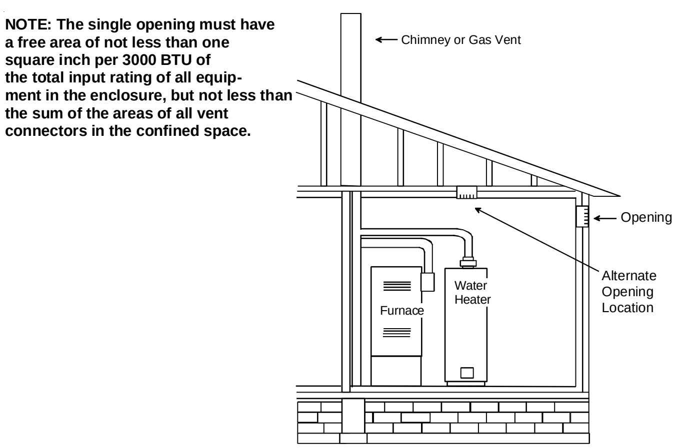
3. When communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 square inch per 2,000 BTU per hour of total input rating of all equipment in the enclosure.



*If the appliance room is located against an outside wall and the air openings communicate directly with the outdoors, each opening shall have a free area of not less than one square inch per 4,000 BTU per hour of the total input rating of all appliances in the enclosure.

Equipment Located in Confined Spaces; All Air from Outdoors. See 5.3.3-b

4. When ducts are used, they shall be of the same cross-sectional area as the free area of the openings to which they connect. The minimum dimension of rectangular air ducts shall not be less than 3 inches.



Equipment Located in Confined Spaces; All Air from Outdoors - Single Air Opening. See 5.3.3-b

5. When directly communicating with the outdoors, the single opening shall have a minimum free area of 1 square inch per 3,000 BTU per hour of total input rating of all equipment in the enclosure.

5.3.4 Specially Engineered Installations:

The requirements of 5.3.3 shall not necessarily govern when special engineering, approved by the authority having jurisdiction, provides an adequate supply of air for combustion, ventilation, and dilution of flue gases.

5.3.5 Louvers and Grilles:

In calculating free area in 5.3.3, consideration shall be given to the blocking effect of louvers, grilles or screens protecting openings. Screens used shall not be smaller than 1/4 inch mesh. If the area through a design of louver or grille is known, it should be used in calculating the size of opening required to provide the free area specified. If the design and free area is not known, it may be assumed that wood louvers will have 20-25 percent free area and metal louvers and grilles will have 60-75 percent free area. Louvers and grilles shall be fixed in the open position or interlocked with the equipment so that they are opened automatically during equipment operation.

5.3.6 Special Conditions Created by Mechanical Exhausting or Fireplaces:

Operation of exhaust fans, ventilation systems, clothes dryers, or fireplaces may create conditions requiring special attention to avoid unsatisfactory operation of installed gas utilization equipment. Air from Inside Building. See 5.3.3-a.

Category I Venting (Vertical Venting)

(80% Furnaces Only)

WARNING

TO PREVENT POSSIBLE PERSONAL INJURY OR DEATH DUE TO ASPHYXIATION, AMANA® BRAND NON-CONDENSING GAS FIRED WAR AIR FURNACES MUST BE CATEGORY I VENTED. DO NOT VENT USING CATEGORY III VENTING.

Category I Venting is venting at a non-positive pressure. A furnace vented as Category I is considered a fan-assisted appliance and does not have to be "gas tight." **NOTE:** Single-Stage and Two-Stage gas furnaces with induced draft blowers draw products of combustion through a heat exchanger allowing in some instances common venting with natural draft appliances (i.e. water heaters).

All installations must be vented in accordance with National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition. In Canada, the furnaces must be vented in accordance with the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments.

NOTE: The vertical height of the Category I venting system must be at least as great as the horizontal length of the venting system.

WARNING

TO PREVENT POSSIBLE PERSONAL INJURY OR DEATH DUE TO ASPHYXIATION, COMMON VENTING WITH OTHER MANUFACTURER'S INDUCED DRAFT APPLIANCES IS NOT ALLOWED.

Common venting two 80% furnaces is allowed only with Amana® brand Category I 80% Single-Stage furnaces with the addition of a common vent kit (CVK) for each appliance. Refer to the 80% furnace *Accessory Charts* in this manual for a tabular listing of appropriate manufacturer's kits.

PRODUCT DESIGN

The minimum vent diameter for the Category I venting system is as shown in the following chart:

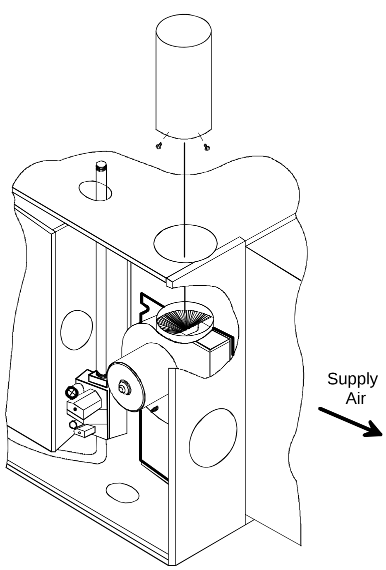
MINIMUM VENT DIAMETER		
MODEL	GUI*	GCI*
45	3 Inch	4 Inch
70	4 Inch	4 Inch
90	4 Inch	4 Inch
115	5 Inch	5 Inch
140	5 Inch	5 Inch

Under some conditions, larger vents than those shown above may be required or allowed.

When an existing furnace is removed from a venting system serving other appliances, the venting system may be too large to properly vent the remaining attached appliances. For complete details refer to *Existing Furnace Removal* section of this manual.

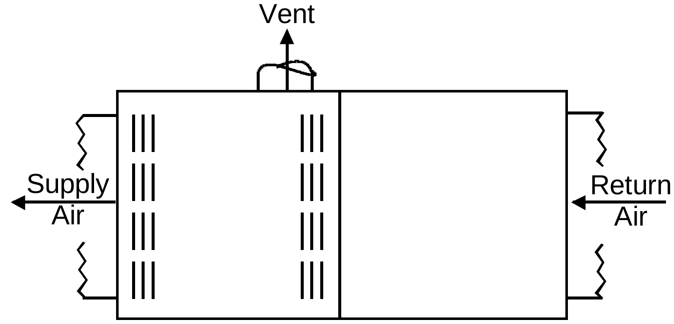
When resizing any portion of the common venting system, use the appropriate table in Appendix G in the latest edition of the National Fuel Gas Code NFPA 54/ANSI Z223.1.

Upflow or Horizontal units are shipped with the induced draft blower discharging from the top of the furnace ("Top" is as viewed for an upflow installation). The induced draft blower can be rotated 90 degrees counterclockwise for Category I venting, with the airflow horizontal left to right. Refer to the following figure. For horizontal installations, a four inch single wall pipe can be used to extend the induced draft blower outlet 1/2" beyond the furnace cabinet. Vent the furnace in accordance with the National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition. In Canada, vent the furnace in accordance with the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments.



80% Upflow Rotated Induced Draft Blower

Counterflow units are shipped with the induced draft blower discharging from the top of the furnace ("Top" as viewed for a counterflow installation). The induced draft blower can be rotated 90 degrees counterclockwise for Category I venting, with the airflow horizontal right to left (Figure 6). For horizontal installations, a three inch B vent pipe can be used to extend the induced draft blower outlet 1/2" beyond the furnace cabinet. Vent the furnace in accordance with the National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition. In Canada, vent the furnace in accordance with the National Standard of Canada, CAN/CGA B149.1 AND CAN/CGA B149.2 - latest editions and amendments.



80% Counterflow Rotated Induced Draft Blower

WARNING

TO PREVENT DEATH OR SERIOUS ILLNESS TO BUILDING OCCUPANTS DUE TO FLUE PRODUCTS LEAKING INTO THE BUILDING, PROPER INSTALLATION OF GASKETS AND SCREWS IS ESSENTIAL FOR PROVIDING A GAS TIGHT SEAL BETWEEN THE PARTITION PANEL AND THE INDUCED DRAFT BLOWER.

Make sure all wires are at least one inch from flue pipe. Relocate junction box to right side of cabinet if necessary. Refer to *Electrical Connections* section of this manual for instructions.

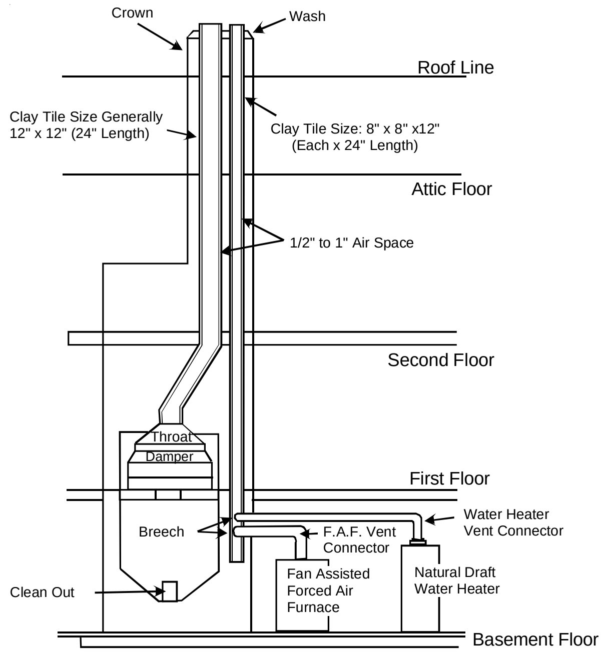
Masonry Chimneys

WARNING

POSSIBILITY OF PROPERTY DAMAGE, PERSONAL INJURY OR DEATH - DAMAGING CONDENSATION CAN OCCUR INSIDE MASONRY CHIMNEYS WHEN A SINGLE FAN ASSISTED CATEGORY 1 APPLIANCE (80%AFUE FURNACE) IS VENTED WITHOUT ADEQUATE DILUTION AIR. DO NOT CONNECT AN 80% FURNACE TO A MASONRY CHIMNEY ULESS THE FURNACE IS COMMON VENTED WITH T DRAFT HOOD EQUIPPED APPLIANCE, OR THE CHIMNEY IS LINED WITH A METAL LINER OR B METAL VENT. ALL INSTALLATIONS USING MASONRY CHIMNEYS MUST BE SIZED IN ACCORDANCE WTIH THE APPROPRIATE VENTING TABLES.

IF AN 80% FURNACE IS COMMON VENTED WITH T DRAFT HOOD EQUIPPED APPLIANCE, THE POTENTIAL FOR CONDENSATION DAMAGE MAY STILL EXIST WITH EXTREMELY COLD CONDITIONS, LONG VENT CONNECTORS, EXTERIOR CHIMNEYS, OR ANY COMBINATION OF THESE CONDITIONS. THE RISK OF CONDENSATION DAMAGE IS BEST AVOIDED BY USING THE MASONRY CHIMNEY AS A PATHWAY FOR PROPERLY SIZED METAL LINER OR B METAL VENT.

PRODUCT DESIGN



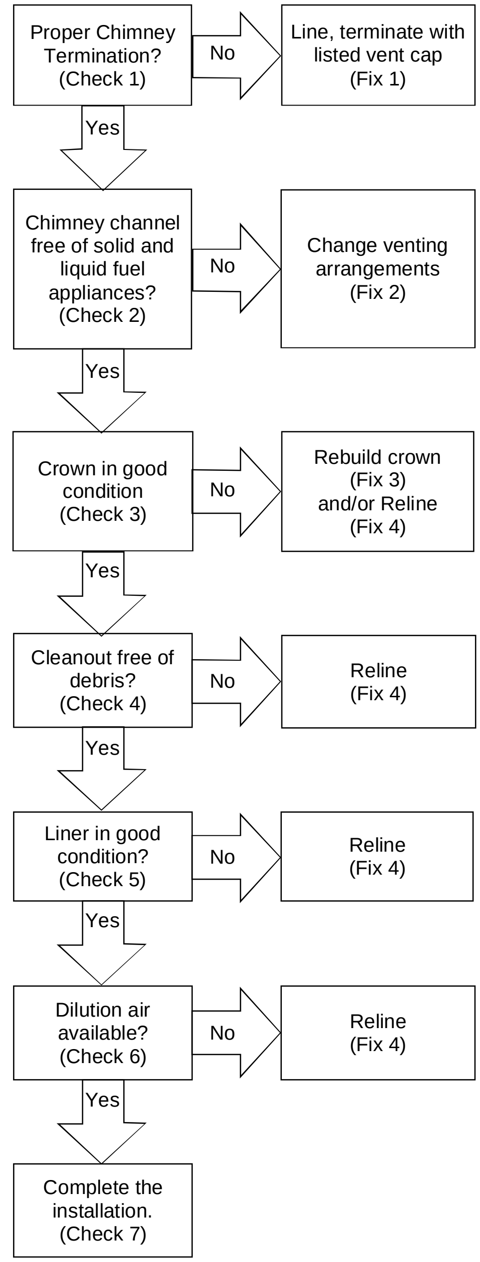
Typical Multiple Flue Clay Tile Chimney

Checklist Summary

This checklist serves as a summary of the items to be checked before venting an Air Command 80 furnace into a masonry chimney. In addition, we recommend that a qualified serviceman use this checklist to perform a yearly inspection of the furnace venting system.

This checklist is only a summary. For detailed information on each of the procedures mentioned, see the paragraph referenced with each item.

This inspection is based upon a draft topical report, "Masonry Chimney Inspection and Relining", issued by the Gas Research Institute. While not yet finalized, we believe this report represents the best information on this subject which is currently available.

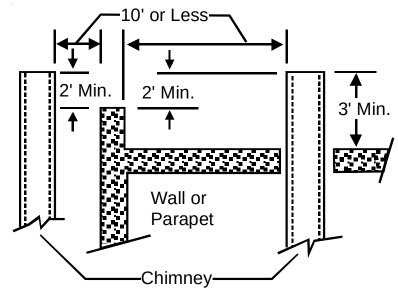


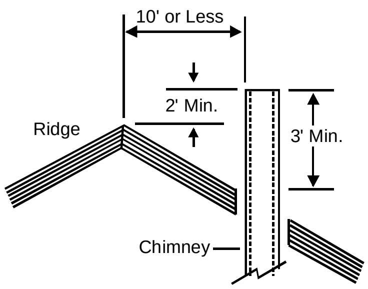
Check 1 - Proper chimney termination.

A masonry chimney used as a vent for gas fired equipment must extend at least three feet above the highest point where it passes through the roof. It must extend at least two feet higher than any portion of a building within a horizontal distance of 10 feet. In addition, the chimney must terminate at least 3 feet above any forced air inlet located within 10 feet. The chimney must extend at least five feet above the highest connected equipment draft hood outlet or flue collar.

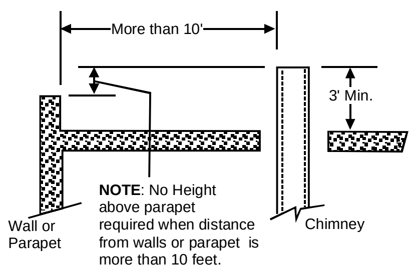
If the chimney does not meet these termination requirements, but all other requirements in the checklist can be met, it may be possible for a mason to extend the chimney. If this will not be practical, see Fix 1.

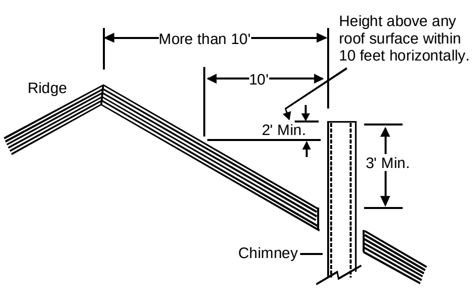
PRODUCT DESIGN





Termination 10 Feet Or Less From Ridge, Wall or Parapet





Termination More Than 10 Feet From Ridge, Wall or Parapet

Check 2 - Any solid or liquid fuel appliances vented into this chimney channel.

Solid fuel appliances include fireplaces, wood stoves, coal furnaces, and incinerators.

Liquid fuel appliances include oil furnaces, oil-fired boilers and oil-fired water heaters.

Appliances which burn propane (sometimes referred to as LP (liquefied petroleum)) gas are considered gas-fired appliances.

Check 3 - Chimney Crown Condition.

Damage from condensate usually shows up first in the crown. If any of the following trouble signs are present, the condition of the crown is not satisfactory:

a) Crown leaning

b) Bricks missing

c) Mortar missing

d) Tile liner cracked

e) No tile liner

f) Salt staining at mortar joints. (White stains, and mortar becomes sandy and/or erodes.)

For problems a, b, or c, see Fix 3. If problems d, e, or f are present, see Fix 4. **IMPORTANT:** It may be necessary to follow both Fix 3 and Fix 4.

Check 4 - Debris in Cleanout

A cleanout (dropleg) must be present such that the upper edge of the cleanout cover is at least 12 inches below the lower edge of the lowest chimney inlet opening.

A chimney without a cleanout could become partially blocked by debris. If no cleanout is present, the chimney must be refined (Fix 4).

Remove the cleanout cover, and examine the cleanout for debris. If significant amounts of any of the following are found:

- Fuel oil residue
- Bricks
- Mortar or sand
- Pieces of the tile liner
- Rusted pieces of the metallic liner

reline the chimney (Fix 4).

Check 5 - Liner Condition.

If a metal liner is present, it must be checked. It cannot be assumed that all existing metal liners are correctly installed and in good condition.

Remove the lowest existing vent connector, and examine the inside of the elbow or tee at the base of the liner. A small amount of soot may be considered acceptable, provided the installer vacuums it away. If rusted pieces of the liner have collected here, the metal liner must be removed and replaced (Fix 4).

Next, gently tap the inside of the liner with a Phillips screwdriver. If the screwdriver perforates the liner, or if the tapping does not sound like metal hitting metal, the liner must be removed and replaced (Fix 4).

Remember that all appliances must be vented inside the liner. Venting one appliance inside the liner and another appliance outside the liner is not acceptable.

Next, use a flashlight and small mirror to sight up the liner. B vent must be supported so as to not come into direct contact with the chimney walls or tile liner. If it is not, it can probably be rehung so as to be acceptable. A thimble or fire stop may be helpful here.

Flexible liners should be hung straight or nearly straight. If it is spiraled in the chimney and in good condition, it should be rehung. To do this, break the top seal; pull up and cut off the excess liner length, and refit the top seal. Use caution when doing this, as the cut edges of flexible liners may be sharp.

The surfaces of the liner must be physically sound. If gaps or holes are present, the metal liner must be removed and replaced (Fix 4).

Finally, confirm that the metal liner is the correct size for the appliances to be installed. Use the GAMA tables and rules.

If a metal liner is not present, a clay tile liner must be present, or the chimney must be lined (Fix 4).

Use a flashlight and small mirror at the cleanout or vent connector to inspect the clay tile liner. If any of the following problems are present:

- Tile sections misaligned
- Tile sections missing
- Gaps between tile sections
- Signs of condensate drainage at the cleanout or vent connectors
- Mortar protruding from between tile sections
- Use of sewer pipe or drainage pipe rather than an approved fire clay tile

reline the chimney (Fix 4).

Next, measure the size of the liner. It may be possible to do this from the cleanout. The liner must be at least as large as the minimum size established by the tables in National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition and in the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments. If the liner is too small or too large, then the chimney must be relined (Fix 4).

Check 6 - Dilution Air.

If gas-fired appliances are to be vented into a clay tile liner, a source of dilution air is required.

Dilution air cannot be obtained through:

- Induced draft appliances
- Natural draft appliances with vent dampers

Sufficient dilution air can ordinarily be obtained through the draft hood of a natural draft appliance only if the appliance's vent connector does not include a vent damper.

If dilution air will not be available, the chimney must be relined (Fix 4).

Check 7 - Complete the Installation.

If Checks 1 through 6 have been satisfactory, and the liner is an acceptable size as determined by the tables in National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition and in the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments, then the clay tile liner can probably be used as a vent for the gas appliances. However, the installer must keep in mind the following factors which may render the tile liner unsuitable for use as a vent:

- Extremely cold weather
- Long vent connectors
- Masonry chimneys with no air gap between the liner and the bricks. (In practice, this can be difficult to detect.)
- Exterior chimneys (The tables in National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition and in the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments assume interior chimneys.)

If, in the judgment of the local gas utility, installer, and/or local codes; one or more of the above factors is likely to present a problem, the chimney must be relined (Fix 4).

Fix 1 - Liner Termination.

Any cap or roof assembly used with a liner must be approved by the liner manufacturer for such use. The liner and cap/roof assembly must then terminate above the roof in accordance with the manufacturer's instructions.

In some cases, a shorter extension above the roof may be possible with a liner than would be required with a masonry chimney.

For further information on relining, see Fix 4.

Fix 2 - Change Venting Arrangements

If the masonry chimney has more than one channel, it may be possible to vent the gas appliances into one channel and vent the solid or liquid fuel appliance(s) into another channel(s). Do not vent an Air Command 80 inside of a metal liner with other appliances vented outside the liner.

Alternatively, the homeowner may agree to discontinue use of the fireplace (solid fuel appliance). If so, the tile liner must be cleaned to remove creosote buildup. The fireplace opening must then be permanently sealed.

If oil-fired appliance(s) are being replaced by gas-fired appliance(s), the tile liner must first be cleaned to remove the fuel oil residue.

If none of the above options are practical, the Air Command 80 may need to be vented vertically with B vent.

Under some conditions an Air Command 90 or 95 could be installed rather than an Air Command 80. The Air Command 90 or 95 can be vented horizontally or vertically through PVC pipe.

PRODUCT DESIGN

Fix 3 - Rebuild the Crown.

If the chimney crown is damaged, a qualified mason must repair it in accordance with nationally recognized building codes or standards. One such standard which may be referenced is the Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances, ANSI/NFPA 211.

Fix 4 - Relining.

Relining options include B vent and flexible liners.

If the chimney has diagonal offsets, B vent probably cannot be used.

If B vent is to be used, it must be supported adequately. Supports (such as fire stops or thimbles) must be used to prevent the B vent from coming into direct contact with the tile liner or chimney walls. Direct contact would result in higher heat loss, with an increased possibility of poor venting system performance.

It is not acceptable to vent one appliance inside the B vent and other appliances outside. The excess space between the B vent and the chimney walls must be covered at the top of the chimney by a weatherproof, corrosion resistant flashing.

The B vent should then be topped with a listed vent cap. The listed vent cap will, when installed per the manufacturer's instructions, prevent problems due to rain, birds, or wind effects.

A B vent installed as described in this section is considered to be an enclosed vent system, and the sizing tables in National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition and in the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments may be used.

If a flexible liner is to be used, it must be made of the proper materials:

- For most residential applications, an aluminum liner should be acceptable.
- If the combustion air supplied to the furnace will be contaminated with compounds containing chlorine or fluorine, a liner of AL294C stainless steel should be used. Common sources of chlorine and fluorine compounds include indoor swimming pools and chlorine bleaches, paint strippers, adhesives, paints, varnishes, sealers, waxes (which are not yet dried) and solvents used during construction and remodeling. Various commercial and industrial processes may also be sources of chlorine/fluorine compounds.
- Heavier gauge 300 and 400 series stainless steel liners were developed for use with oil or solid fuel appliances. They are not suitable for use with gas-fired appliances. Flexible liners specifically intended and tested for gas applications are listed in the UL "Gas and Oil Equipment Directory". (UL Standard 1777).

For sizing of flexible liners, see Note 22 and the tables in the National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest edition and in the National Standard of Canada, CAN/CGA B149.1 and CAN/CGA B149.2 - latest editions and amendments.

To install the liner, read and follow the liner manufacturer's instructions and your local codes. Excess liner length should be pulled out of the chimney and cut off. Use caution when doing this, as the cut edges of flexible liners may be sharp. Do not spiral excess liner inside of the chimney. Support the liner as recommended by the liner manufacturer.

Some manufacturers of flexible liners offer an insulation sleeve designed to be added to the liner before it is installed in the chimney. (Poured insulation, either vermiculite or other materials, is no longer recommended.) Insulation will need to be added to the flexible liner if:

- It is required by the liner manufacturer's instructions.
- The previous liner was properly sized and installed, and suffered from condensation damage.
- It is required by your local building codes.

Even if none of those three conditions exist which require additional liner insulation, the installer may wish to consider it if:

- The local climate is very cold.
- The chimney is very tall.
- The vent connectors used are very long or have a large number of elbows.
- Local experience indicates that flexible liners installed without insulation are likely to have condensation problems.

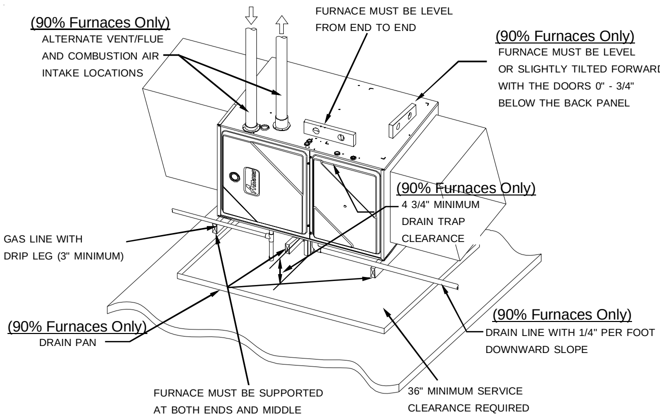
Insulation must be selected and installed in accordance with the liner manufacturer's instructions.

Finally, cap the chimney and terminate the liner in accordance with the liner manufacturer's instructions.

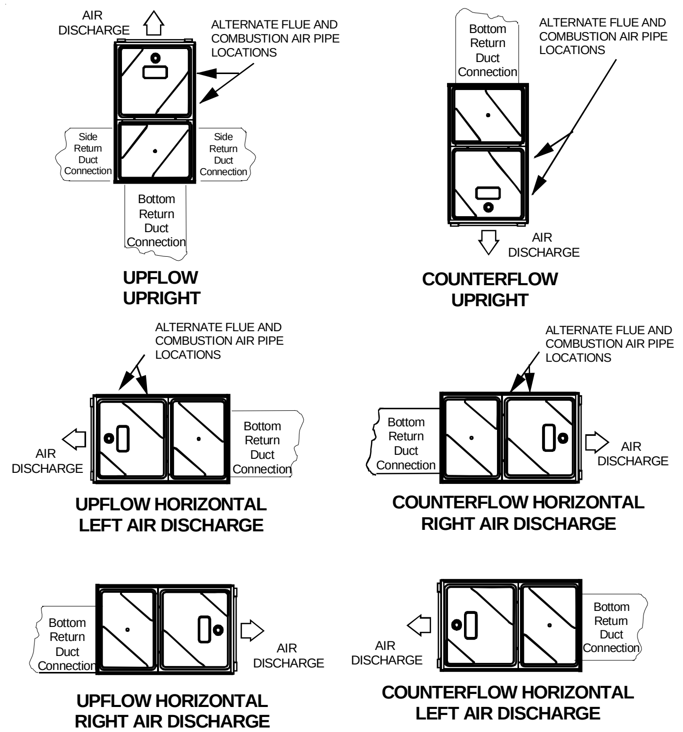
Horizontal Applications and Considerations

Horizontal applications, in particular, may dictate many of the installation's specifics such as airflow direction, ductwork connections, flue and/or combustion air pipe connections, etc. The basic application of this furnace as a horizontal furnace differs only slightly from an upright installation. When installing a furnace horizontally, additional consideration must be given to the following:

PRODUCT DESIGN



90% Horizontal Furnace Shown
(80% Horizontal Furnace Similar)



90% Furnace Recommended Installation Positions

DRAIN TRAP AND LINES (90% FURNACES ONLY)

In horizontal applications the condensate drain trap is secured to the furnace side panel, suspending it below the furnace. A minimum clearance of 4 3/4" below the furnace must be provided for the drain trap. Additionally, the appropriate downward piping slope must be maintained from the drain trap to the drain location. Refer to *Condensate Drain Trap and Lines* section in this manual or the installation instructions for further details. If the drain trap and drain line will be exposed to temperatures near or below freezing, adequate measures must be taken to prevent condensate from freezing. **NOTE:** The use of insulation and/or heat tape is recommended. Failure to provide proper condensate drainage can result in property damage.

LEVELING (90% FURNACES ONLY)

Leveling ensures proper condensate drainage from the heat exchanger and induced draft blower. For proper flue pipe drainage, the furnace must be level lengthwise from end to end. The furnace should also be level from back to front or have a slight tilt with the access doors downhill (approximately 3/4") from the back panel. The slight tilt allows the heat exchanger condensate, generated in the recuperator coil, to flow forward to the recuperator coil front cover.

ALTERNATE VENT/FLUE AND COMBUSTION AIR CONNECTIONS (90% FURNACES ONLY)

In horizontal installations provisions for alternate flue and combustion air piping are available for upflow furnaces with left discharge. In these positions the flue and combustion air piping can be run vertically through the side of the furnace. Refer to the following figure "Recommended Installation Positions" for further detail. The standard piping connections may also be used in these positions. Refer to *Vent/Flue Pipe and Combustion Air Pipe* section in this manual or the installation instructions for details concerning the conversion to the alternate vent/flue and combustion air connections on the 90% furnace.

NOTE: Alternate "vertical" piping connections can not be used when an upflow 90% furnace is installed with supply air discharging to the right. In this case, use the standard flue and combustion air piping connections

ALTERNATE ELECTRICAL AND GAS LINE CONNECTIONS

The 80% & 90% furnaces have provisions allowing for electrical and gas line connections through either side panel. In horizontal applications the connections can be made either through the “top” or “bottom” of the furnace.

DRAIN PAN (90% FURNACES ONLY)

A drain pan must be provided if the furnace is installed above a conditioned area. The drain pan must cover the entire area under the furnace (and air conditioning coil if applicable).

FREEZE PROTECTION (90% FURNACES ONLY)

If the drain trap and drain line will be exposed to temperatures near or below freezing, adequate measures must be taken to prevent condensate from freezing. **NOTE:** The use of insulation and/or heat tape is recommended. Failure to provide proper condensate drainage can result in property damage.

PRODUCT DESIGN

Propane Gas and/or High Altitude Installations

WARNING

POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH MAY OCCUR IF THE CORRECT CONVERSION KITS ARE NOT INSTALLED. THE APPROPRIATE KITS MUST BE APPLIED TO INSURE SAFE AND PROPER FURNACE OPERATION. ALL CONVERSIONS MUST BE PERFORMED BY A QUALIFIED INSTALLER OR SERVICE AGENCY.

This furnace is shipped from the factory configured for natural gas at standard altitude. Propane gas installations require an orifice change to compensate for the energy content difference between natural and propane gas.

High altitude installations may require both a pressure switch and an orifice change. These changes are necessary to compensate for the natural reduction in the density of both the gas fuel and the combustion air at higher altitude.

Refer to the *Accessories Charts* in this manual or product Specification Sheet for a tabular listing of appropriate manufacturer's kits for propane gas and/or high altitude installations. The indicated kits must be used to insure safe and proper furnace operation. All conversions must be performed by a qualified installer, or service agency.

Vent/Flue Pipe and Combustion Air Pipe (90% Furnaces Only)

WARNING

FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN BODILY INJURY OR DEATH. CAREFULLY READ AND FOLLOW ALL INSTRUCTIONS GIVEN IN THIS SECTION.

WARNING

UPON COMPLETION OF THE FURNACE INSTALLATION, CAREFULLY INSPECT THE ENTIRE FLUE SYSTEM BOTH INSIDE AND OUTSIDE THE FURNACE TO ASSURE IT IS PROPERLY SEALED. LEAKS IN THE FLUE SYSTEM CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH DUE TO EXPOSURE TO FLUE PRODUCTS, INCLUDING CARBON MONOXIDE.

A condensing gas furnace achieves its high level of efficiency by extracting almost all of the heat from the products of combustion and cooling them to the point where condensation takes place. Because of the relatively low flue gas temperature and water condensation requirements, PVC pipe is used as venting material.

This furnace must not be connected to Type B, BW, or L vent or vent connector, and must not be vented into any portion of a factory built or masonry chimney except when used as a pathway for PVC as described later in this section. **Never** common vent this appliance with another appliance or use a vent which is used by a solid fuel appliance. **Do not** use commercially available "no hub connectors" other than those shipped with this product.

It is the responsibility of the installer to follow the manufacturers' recommendations and to verify that all vent/flue piping and connectors are compatible with furnace flue products. Additionally, it is the responsibility of the installer to ensure that all piping and connections possess adequate structural integrity and support to prevent flue pipe separation, shifting, or sagging during furnace operation.

DUAL CERTIFICATION: NON-DIRECT/DIRECT VENT (90% FURNACES ONLY)

The 90% furnace is dual certified and may be installed as a non-direct vent (single pipe) or direct vent (dual pipe) appliance. A *non-direct vent* installation requires only a vent/flue pipe, while a *direct vent* installation requires both a vent/flue pipe and a combustion air intake pipe. Refer to the appropriate section for details concerning piping size, length, number of elbows, furnace connections, and terminations.

MATERIALS AND JOINING METHODS (90% FURNACES ONLY)

WARNING

TO AVOID BODILY INJURY, FIRE OR EXPLOSION, SOLVENT CEMENTS MUST BE KEPT AWAY FROM ALL IGNITION SOURCES (I.E., SPARKS, OPEN FLAMES, AND EXCESSIVE HEAT) AS THEY ARE COMBUSTIBLE LIQUIDS. AVOID BREATHING CEMENT VAPORS OR CONTACT WITH SKIN AND/OR EYES.

Two or three inch nominal diameter PVC Schedule 40 pipe meeting ASTM D1785, PVC primer meeting ASTM F656, and PVC solvent cement meeting ASTM D2564 specifications must be used. Fittings must be DWV type fittings meeting ASTM D2665 and ASTM D3311. Carefully follow the manufacturer's instructions for cutting, cleaning, and solvent cementing of PVC.

As an alternative to PVC pipe, primer, solvent cement, and fittings, ABS materials which are in compliance with the following specifications may be used. Two or three inch ABS Schedule 40 pipe must meet ASTM D1527 and, if used in Canada, must be CSA listed. Solvent cement for ABS to ABS joints must meet ASTM D2235 and, if used in Canada, must be CSA listed. The solvent cement for the PVC to ABS transition joint must meet ASTM D3138. Fittings must be DWV type fittings meeting ASTM D2661 and ASTM D3311 and, if used in Canada, must be CSA listed. Carefully follow the manufacturers' instructions for cutting, cleaning, and solvent cementing PVC and/or ABS.

All 90° elbows must be medium radius (1/4 bend DWV) or long radius (Long sweep 1/4 bend DWV) types conforming to ASTM D3311. A medium radius (1/4 bend DWV) elbow measures 3 1/16" minimum from the plane of one opening to the centerline of the other opening for 2" diameter pipe, and 4 9/16" minimum for 3" pipe.

PRODUCT DESIGN

PROPER VENT/FLUE AND COMBUSTION AIR PIPING PRACTICES (90% FURNACES ONLY)

Adhere to these instructions to ensure safe and proper furnace performance. The length, diameter, and number of elbows of the vent/flue pipe and combustion air pipe (when applicable) affects the performance of the furnace and must be carefully sized. All piping must be installed in accordance with local codes and these instructions.

Piping must be adequately secured and supported to prohibit sagging, joint separation, and/or detachment from the furnace. Horizontal runs of vent/flue piping must be supported every three feet and must maintain a 1/4 inch per foot downward slope, back towards the furnace, to properly return condensate to the furnace's drain system. Allowances should be made for minor expansion and contraction due to temperature variations. For this reason, particular care must be taken to secure piping when a long run is followed by a short offset of less than 40 inches.

Precautions should be taken to prevent condensate from freezing inside the vent/flue pipe and/or at the vent/flue pipe termination. All vent/flue piping exposed to freezing temperatures below 35° F for extended periods of time must be insulated with 1/2" thick closed cell foam. Also all vent/flue piping exposed outdoors in excess of the terminations shown in this manual (or in unheated areas) must be insulated with 1/2" thick closed cell foam such as "Armaflex" or "Insultube". Inspect piping for leaks prior to installing insulation.

TERMINATION LOCATIONS (90% FURNACES ONLY)

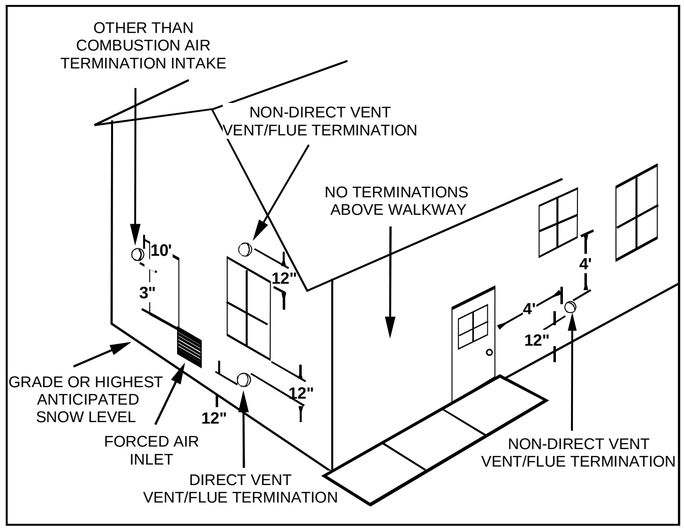
NOTES: Refer to *Location Requirements and Considerations* section of this manual or the installation instructions for combustion air contaminant restrictions.

The following bullets and diagram describe the restrictions concerning the appropriate location of vent/flue pipe and combustion air intake pipe (when applicable) terminations. Refer to *Non-Direct Vent (Single Pipe) Piping* and *Direct Vent (Dual Pipe) Piping* sections located in this manual or the installation instructions for specific details on termination construction.

- All terminations must be located at least 12 inches above ground level or the anticipated snow level.
- Vent terminations must terminate at least 3 feet above any forced air inlet located within 10 feet.

  NOTE: This provision does not apply to the combustion air intake termination of a direct vent application.
- The vent termination of a *non-direct vent* application must terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window, or gravity air inlet into any building.
- The vent termination of a *direct vent* application must terminate at least 12 inches from any opening through which flue gases may enter a building (door, window, or gravity air inlet).
- The vent termination of vent pipe run vertically through a roof must terminate at least 12 inches above the roof line (or the anticipated snow level) and be at least 12 inches from any vertical wall (including any anticipated snow build up).
- A vent termination shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment.
- The combustion air intake termination of a direct vent application should not terminate in an area which is frequently dusty or dirty.

NOTE: In Canada, the Canadian Fuel Gas Code takes precedence over the preceding termination restrictions.



90% Furnace Vent Termination Clearances

CANADIAN VENTING REQUIREMENTS (90% FURNACES ONLY)

In Canada, venting must conform to the requirements of the current CAN/CGA-B149 Installation Code. Use only CSA listed two or three inch diameter PVC or ABS pipe, solvent cement, and fittings throughout. Carefully follow the manufacturers' instructions for cutting, cleaning, and solvent cementing PVC and/or ABS.

The vent can be run through an existing unused chimney provided the space between the vent pipe and the chimney is insulated and closed with a weather-tight, corrosion-resistant flashing.

The vent shall *not* be located:

- Less than 12 inches above the finished grade line.
- Less than 36 inches from any building opening or any gas service regulator. For gas service regulators in the Province of Ontario, 72 inches.

- Less than 72 inches from the combustion air intake of another appliance.
- Directly above a gas utility meter or service regulator.
- Over a walkway unless located 84 inches above grade.

STANDARD FURNACE CONNECTIONS (90% FURNACES ONLY)

It is the responsibility of the installer to ensure that the piping connections to the furnace are secure, airtight, and adequately supported.

As shipped, attachment "couplings" for vent/flue and combustion air intake pipe connections are provided on the furnace's top cover (upflow). To use the standard connections, field supplied vent/flue pipe and combustion air intake pipe (when applicable) should be secured directly to the furnace at these locations.

Vent/Flue Pipe (90% Furnaces Only)

Vent/flue pipe can be secured to the vent/flue coupling using the rubber coupling and worm gear hose clamps provided with this furnace. Torque hose clamps to 20 inch-lbs (see "Standard Connections" figure). The rubber coupling allows separation of the vent/flue pipe from the furnace during servicing. **NOTE:** Do not use other commercially available "no hub connectors" due to possible material conflicts. The vent/flue pipe can also be secured using a PVC or ABS elbow or coupling using the appropriate glue (see *Materials and Joining Methods section* in this manual or the installation instructions for further details).

NOTE: For *non-direct vent* installations, a minimum of one 90° elbow must be installed on the combustion air intake coupling to guard against inadvertent blockage.

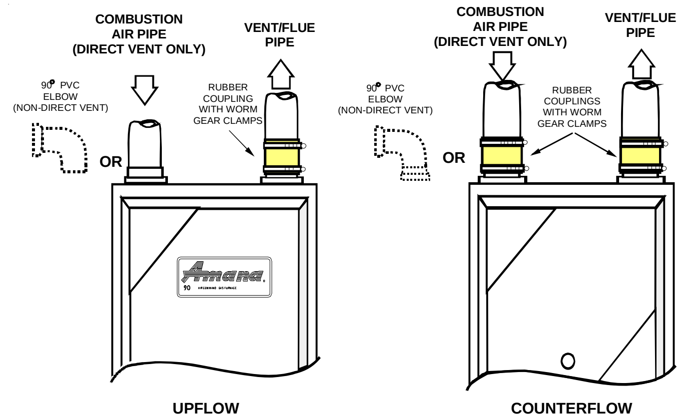
Combustion Air Pipe (90% Furnaces Only)

Direct Vent Installations

On *upflow* units secure the combustion air intake pipe directly to the air intake coupling. On *counterflow* units secure the combustion air intake pipe to the air intake coupling using the rubber coupling and worm gear hose clamps provided with the unit. The counterflow rubber coupling allows service removal of air intake piping internal to the furnace blower compartment. **NOTE:** Because of probable material conflicts, do not use other commercially available "no hub connectors". The combustion air intake pipe can also be secured directly to the counterflow unit air intake pipe coupling.

Non-Direct Vent Installations

A minimum of one 90° elbow must be installed on the combustion air intake "coupling" to guard against inadvertent blockage.



90% Furnace Vent/Flue & Combustion Air Standard Connections

ALTERNATE FURNACE CONNECTIONS (90% FURNACES ONLY)

If the standard locations are undesirable for a specific installation, alternate side panel locations are available for both combustion air inlet and vent/flue pipe connections. These locations may be of particular benefit to upright upflow installations requiring additional access to an **A** coil or to horizontal installations desiring vent/flue (and combustion air intake) piping run vertically from the side of the cabinet.

NOTE: Standard and alternate locations can be combined (i.e., an installation may use the standard combustion air intake location but use the alternate vent/flue location or vice versa), if needed.

CAUTION

Edges of sheet metal holes may be sharp. Use gloves a precaution when removing hole plugs.

The alternate vent/flue location is the large hole directly in line with the induced draft blower outlet. Refer to the following "Alternate Vent/Flue Location" figure for details.

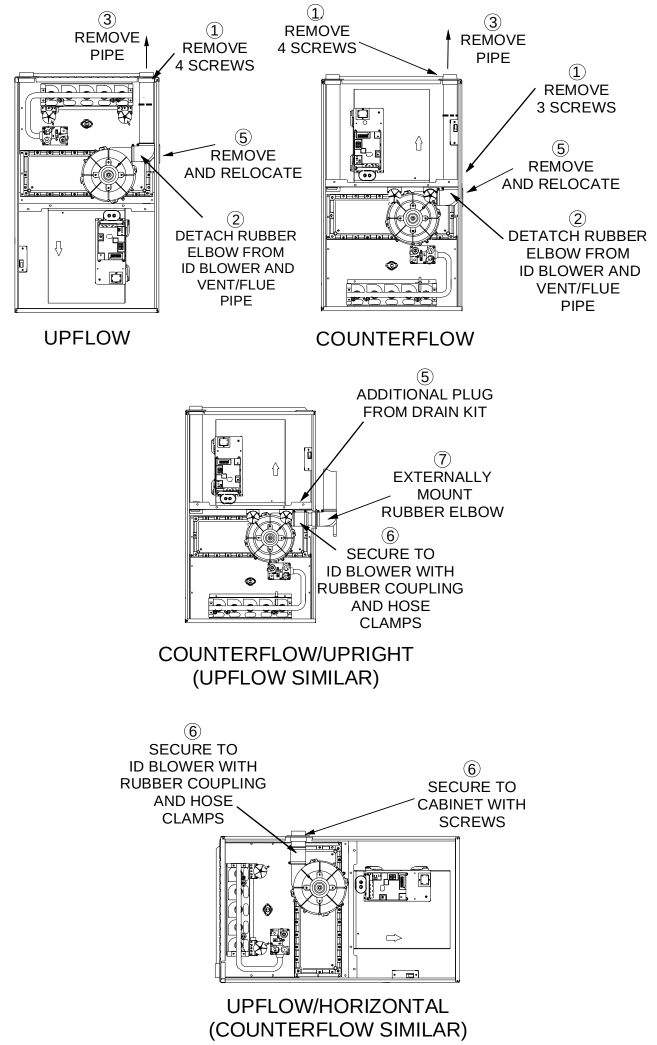
WARNING

The rubber elbow is not designed to support a load. When the rubber elbow is mounted externally to the furnace cabinet, extreme care must be taken to adequately support field-supplied vent/flue piping. As damage can result in leaks causing bodily injury or death due to exposure to flue gases, including carbon monoxide.

For **upright installations**, externally mount the rubber elbow to the vent/flue coupling using a worm gear hose clamp. Secure field supplied vent/flue piping to the rubber elbow using a worm gear hose clamp. **NOTE:** Use of the alternate vent/flue location for upright installations, requires the drain trap be installed on the same side of the unit as the flue pipe.

PRODUCT DESIGN

For ***horizontal installations***, externally secure the field-supplied vent/flue pipe directly to the vent/flue coupling using a PVC or ABS coupling or elbow.



90% Furnace Alternate Vent/Flue Location

Alternate Combustion Air Intake Location (90% Furnaces Only)

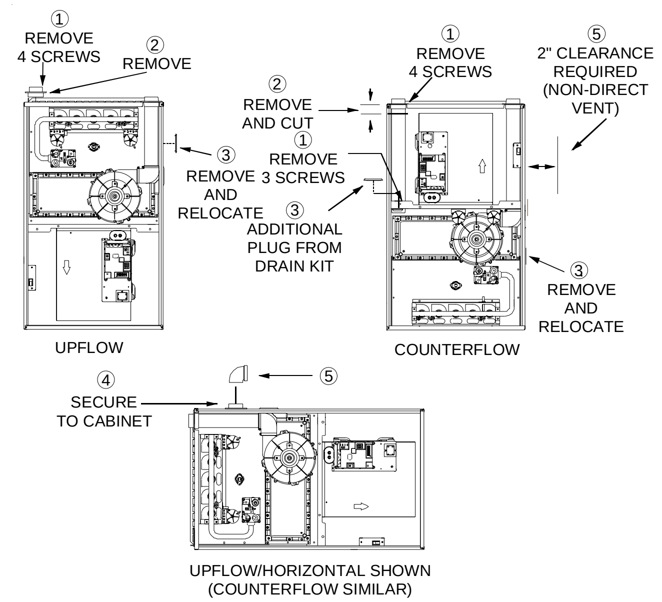
The alternate combustion air intake location is the large hole *not* in line with the induced draft blower outlet. Refer to the following "Alternate Combustion Air Intake Location" figure for details.

CAUTION

BE SURE NOT TO DAMAGE INTERNAL WIRING OR OTHER COMPONENTS WHEN REINSTALLING COUPLING AND SCREWS.

For ***non-direct vent installations*** installed *horizontally*, a minimum of one 90° elbow must be installed on the combustion air intake coupling to guard against inadvertent blockage. No elbow is required on the alternate combustion air intake of *upright* installations, however, a minimum clearance of 2 inches is required to assure proper air supply.

For ***direct vent installations***, secure field-supplied combustion air intake pipe directly to the air intake coupling.



90% Furnace Alternate Combustion Air Intake Location

NON-DIRECT VENT (SINGLE PIPE) PIPING (90% FURNACES ONLY)

Non-direct vent installations require only a vent/flue pipe. The vent pipe can be run horizontally with an exit through the side of the building or run vertically with an exit through the roof of the building. The vent can also be run through an existing *unused* chimney; however, it must extend a minimum of 12 inches above the top of the chimney. The space between the vent pipe and the chimney must be closed with a weather-tight, corrosion-resistant flashing. For details concerning connection of the vent/flue pipe to the furnace, refer to *Vent/Flue Pipe and Combustion Air Pipe - Standard Furnace Connections or Alternate Furnace Connections* section in this manual or the installation instructions for specific details. Refer to the following *Non-Direct Vent (Single Pipe) Piping - Vent/Flue Pipe Terminations* section in this manual or the installation instructions for specific details on termination construction.

Although *non-direct vent* installations do not require a combustion air intake *pipe*, a minimum of one 90° elbow must be attached to the furnace's combustion air intake *if*, an upright installation uses the standard intake location, or a horizontal installation uses the alternate air intake location. This elbow will guard against inadvertent blockage of the air intake.

PRODUCT DESIGN

Vent/Flue Pipe Lengths and Diameters (90% Furnaces Only)

Refer to the following tables for applicable length, elbows, and pipe diameter for construction of the vent/flue pipe system of a non-direct vent installation. In addition to the vent/flue pipe, a single 90° elbow must be secured to the combustion air intake to prevent inadvertent blockage. The tee or elbows used in the vent/flue termination must be included when determining the number of elbows in the piping system.

GUCA & GCCA Model Furnaces
Non-Direct Vent (Single Pipe) Venting Table
Maximum Allowable Length of Vent/Flue Pipe (ft) (1) (2)

Unit Input (BTU)	Pipe (4) Size (inch)	Number of Elbows (3)						
		2	3	4	5	6	7	8
45,000	2	68	65	62	59	56	53	50
70,000	2	68	65	62	59	56	53	50
90,000	2	60	57	55	52	50	47	45
115,000 [0 - 4,500 ft]	2	45	42	40	37	35	32	30
	3	111	107	104	100	97	93	90
115,000 [4,500 - 11,000 ft]	2	25	22	20	17	15	12	10
	3	58	55	52	49	46	43	40

GUVA Model Furnaces
Non-Direct Vent (Single Pipe) Venting Table
Maximum Allowable Length of Vent/Flue Pipe (ft) (1) (2)

Unit Input (Btu)	Pipe(4) Size (inch)	Number of Elbows (3)							
		1	2	3	4	5	6	7	8
45,000	2	71	68	65	62	59	56	53	50
70,000	2	49	46	43	40	37	34	31	28
	3	71	68	65	62	59	56	53	50
90,000	3	71	68	65	62	59	56	53	50
115,000	3	49	46	43	40	37	34	31	28

GUSA Model Furnaces
Non-Direct Vent (Single Pipe) Venting Table
Maximum Allowable Length of Vent/Flue Pipe (ft) (1) (2)

Unit Input (BTU)	Pipe (4) Size (inch)	Number of Elbows (3)							
		1	2	3	4	5	6	7	8
70,000	2	71	68	65	62	59	56	53	50
90,000	2	61	58	55	52	49	46	43	40
	3	71	68	65	62	59	56	53	50
115,000	3	71	68	65	62	59	56	53	50

GULA/GCLA Model Furnaces
Non-Direct Vent (Single Pipe) Venting Table
Maximum Allowable Length of Vent/Flue Pipe (ft) (1) (2)

Unit Input (Btu)	Pipe(4) Size (inch)	Number of Elbows (3)						
		2	3	4	5	6	7	8
45,000	2	68	65	62	59	56	53	50
70,000	2	68	65	62	59	56	53	50
90,000	2	60	57	55	52	50	47	45
115,000	2	25	22	20	17	15	12	10
	3	58	55	52	49	46	43	40

GCVA Model Furnaces
Non-Direct Vent (Single Pipe) Venting Table
Maximum Allowable Length of Vent/Flue Pipe (ft) (1) (2)

Unit Input (BTU)	Pipe (4) Size (inch)	Number of Elbows (3)							
		1	2	3	4	5	6	7	8
70,000	2	61	58	55	52	49	46	43	40
	3	71	68	65	62	59	56	53	50
90,000	2	61	58	55	52	49	46	43	40
	3	71	68	65	62	59	56	53	50

(1) One 90° elbow must be secured to the combustion air intake connection.

(2) Minimum vent length is five feet and one elbow/tee.

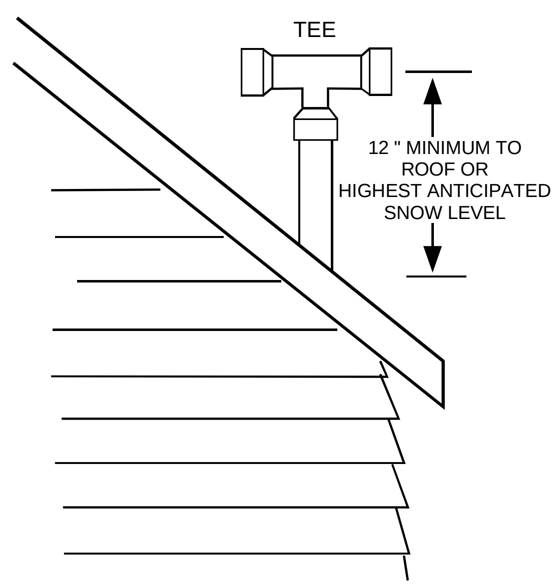
(3) Tee or elbows used in the vent/flue termination must be included when determining the number of elbows in the piping system.

(4) 3" diameter pipe can be used in place of 2" diameter pipe.

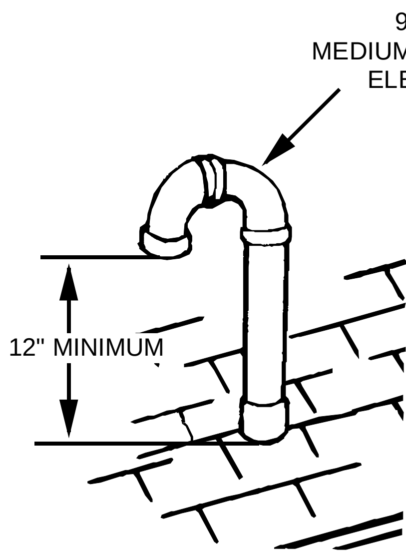
Vent/Flue Pipe Terminations (90% Furnaces Only)

The vent/flue pipe may terminate vertically, as through a roof, or horizontally, as through an outside wall.

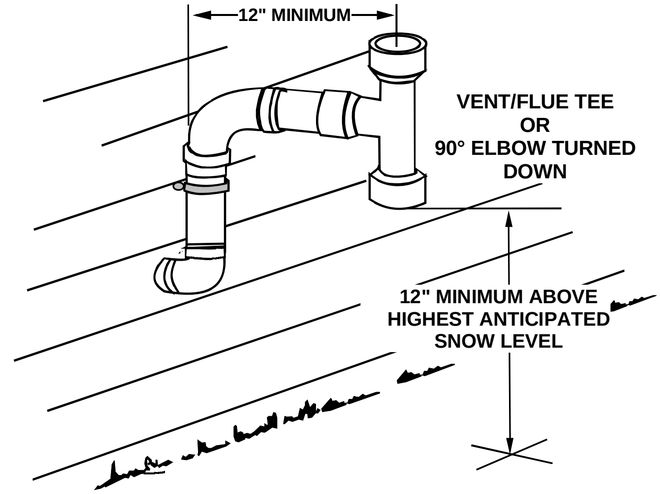
Vertical vent/flue pipe termination should be as shown in the following figures. Refer to *Vent/Flue Pipe and Combustion Air Pipe - Termination Locations* section in this manual or the installation instructions for details concerning location restrictions. The penetration of the vent through the roof must be sealed tight with proper flashing such as is used with a plastic plumbing vent.



90% Furnace Standard Vertical Termination (Single Pipe)

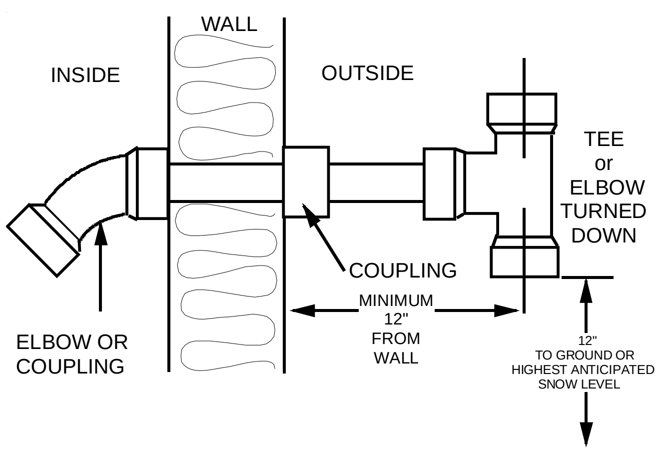


90% Furnace Alternate Vertical Termination (Single Pipe)



90% Furnace Horizontal Termination (Single Pipe) Above Highest Anticipated Snow Level

Horizontal vent/flue pipe terminations should be as shown in the following figure. Refer to *Vent/Flue Pipe and Combustion Air Pipe - Termination Locations* section in this manual or the installation instructions for details concerning location restrictions. A 2 3/8" diameter wall penetration is required for 2" diameter pipe while a 3 1/2" diameter hole is required for 3" diameter pipe. To secure the pipe passing through the wall and prohibit damage to piping connections, a coupling should be installed on either side of the wall and solvent cemented to a length of pipe connecting the two couplings. The length of pipe should be the wall thickness plus the depth of the socket fittings to be installed on the inside and outside of the wall. The wall penetration should be sealed with silicone caulking material.



90% Furnace Horizontal Termination (Single Pipe)

In a basement installation, the vent/flue pipe can be run between joist spaces. If the vent pipe must go below a joist and then up into the last joist space to penetrate the header, two 45° elbows should be used to reach the header rather than two 90° elbows.

DIRECT VENT (DUAL PIPE) PIPING (90% FURNACES ONLY)

Direct vent installations require both a combustion air intake and a vent/flue pipe. The pipes may be run horizontally and exit through the side of the building or run vertically and exit through the roof of the building. The pipes may be run through an existing *unused* chimney; however, they must extend a minimum of 12 inches above the top of the chimney. The space between the pipes and the chimney must be closed with a weather tight, corrosion resistant flashing. Both the combustion air intake and a vent/flue pipe terminations must be in the same atmospheric pressure zone. Refer to *Vent/Flue and Combustion Air Pipe - Termination Locations or Concentric Vent Termination* section in this manual or the installation instructions for specific details on termination construction. For details concerning connection of pipes to the furnace, refer to the *Vent/Flue Pipe and Combustion Pipe - Standard Furnace Connections or Alternate Furnace Connections* section in this manual or the installation instructions.

Vent/Flue and Combustion Air Pipe Lengths and Diameters (90% Furnaces Only)

Refer to the following tables for applicable length, elbows, and pipe diameter for construction of the vent/flue and combustion air intake pipe systems of a direct vent (dual pipe) installation. The number of elbows tabulated represents the number of elbows and/or tees in each (Vent/Flue & Combustion Air Intake) pipe. Elbows and/or tees used in the terminations must be included when determining the number of elbows in the piping systems.

PRODUCT DESIGN

If the combustion air intake pipe is to be installed above a finished ceiling or other area where dripping of condensate will be objectionable, insulation of the combustion air pipe may be required. Use 1/2" thick closed cell foam insulation such as "Armaflex" or "Insultube" where required.

GUCA, GULA & GCCA Model Furnaces
Direct Vent (Dual Pipe) Venting Table
Maximum Allowable Length of Vent/Flue & Combustion Air Intake Pipe (ft)

Unit Input (Btu)	Termination Style	Pipe [4] Size (inch)	Number of Elbows [1] [2] [3]						
			2	3	4	5	6	7	8
45,000	Standard	2	68	65	62	59	56	53	50
	Alternate	2	55	52	49	46	43	40	37
70,000	Standard	2	68	65	62	59	56	53	50
	Alternate	2	5	52	49	46	43	40	37
90,000	Standard	2	55	52	49	46	43	40	37
	Alternate	2	42	39	36	33	30	27	24
115,000	Standard	2	26	23	20	Not Recommended			
	Alternate	2	7	10	Not Recommended				
115,000	Standard	3	88	87	80	76	72	68	64
	Alternate	3	74	70	66	62	58	54	50

GUVA Model Furnaces
Direct Vent (Dual Pipe) Venting Table
Maximum Allowable Length of Vent/Flue Pipe & Combustion Air Intake Pipe (ft)

Unit Input (Btu)	Termination Style	Pipe [4] Size (inch)	Number of Elbows [1] [2] [3]							
			1	2	3	4	5	6	7	8
45,000	Standard	2	71	68	65	62	59	56	53	50
	Alternate	2	58	55	52	49	46	43	40	37
70,000	Standard	2	49	46	43	40	37	34	31	28
		3	71	68	65	62	59	56	53	50
	Alternate	2	36	33	30	27	24	21	18	15
		3	57	54	51	48	45	42	39	36
90,000	Standard	3	71	68	65	62	59	56	53	50
	Alternate	3	57	54	51	48	45	42	39	36
115,000	Standard	3	49	46	43	40	37	34	31	28
	Alternate	3	35	32	29	26	23	20	17	14

GUSA Model Furnaces
Direct Vent (Dual Pipe) Venting Table
Maximum Allowable Length of Vent/Flue & Combustion Air Intake Pipe (ft)

Unit Input (Btu)	Termination Style	Pipe [4] Size (inch)	Number of Elbows [1] [2] [3]							
			1	2	3	4	5	6	7	8
70,000	Standard	2	71	68	65	62	59	56	53	50
	Alternate	2	57	54	51	48	45	42	39	36
90,000	Standard	2	61	58	55	52	49	46	43	40
	Alternate	2	47	44	41	28	35	32	29	26
115,000	Standard	2	71	68	65	62	59	56	53	50
	Alternate	2	57	54	51	48	45	42	39	36

GCVA Model Furnaces
Direct Vent (Dual Pipe) Venting Table
Maximum Allowable Length of Vent/Flue & Combustion Air Intake Pipe (ft)

Unit Input (Btu)	Termination Style	Pipe [4] Size (inch)	Number of Elbows [1] [2] [3]							
			1	2	3	4	5	6	7	8
70,000	Standard	2	49	46	43	40	37	34	31	28
		3	71	68	65	62	59	56	53	50
	Alternate	2	36	33	30	27	24	21	18	15
		3	57	54	51	48	45	42	39	36
90,000	Standard	2	61	58	43	52	49	46	43	40
		3	71	68	65	62	59	56	53	50
	Alternate	2	48	45	30	39	36	33	30	27
		3	57	54	51	48	45	42	39	36

GCLA Model Furnaces
Direct Vent (Dual Pipe) Venting Table
Maximum Allowable Length of Vent/Flue & Combustion Air Intake Pipe (ft)

Unit Input (Btu)	Termination Style	Pipe [4] Size (inch)	Number of Elbows [1] [2] [3]						
			2	3	4	5	56	7	8
45,000	Standard	2	68	65	62	59	43	53	50
	Alternate	2	55	52	49	46	56	40	37
70,000	Standard	2	68	65	62	59	43	53	50
	Alternate	2	5	52	49	46	43	40	37
90,000	Standard	2	55	52	49	46	30	40	37
	Alternate	2	42	39	36	33	30	27	24
115,000	Standard	2	26	23	20	Not Recommended			
	Alternate	2	7	10	Not Recommended				
115,000	Standard	3	88	87	80	76	72	68	64
	Alternate	3	74	70	66	62	58	54	50

(1) Elbows and/or Tees used in the terminations must be included when determining the number of elbows in the piping system.

(2) Number of elbows tabulated are for each (Vent/Flue & Combustion air intake) pipe.

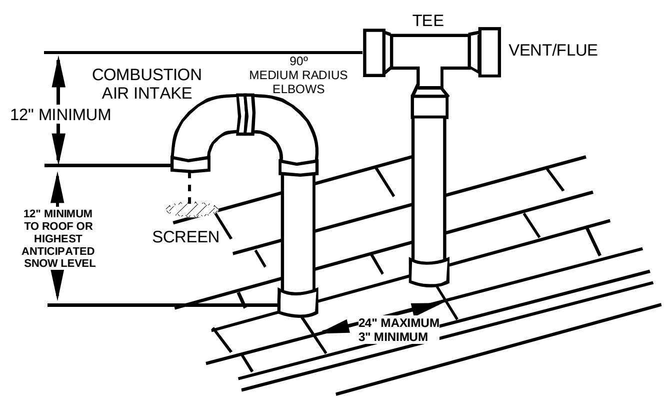
(3) Minimum length of each Vent/Flue & Combustion Air Intake pipe is five feet and one elbow/tee.

(4) 3" diameter pipe can be used in place of 2" diameter pipe.

Vent/Flue and Combustion Air Pipe Terminations (90% Furnaces Only)

The vent/flue and combustion air pipes may terminate vertically, as through a roof, or horizontally, as through an outside wall.

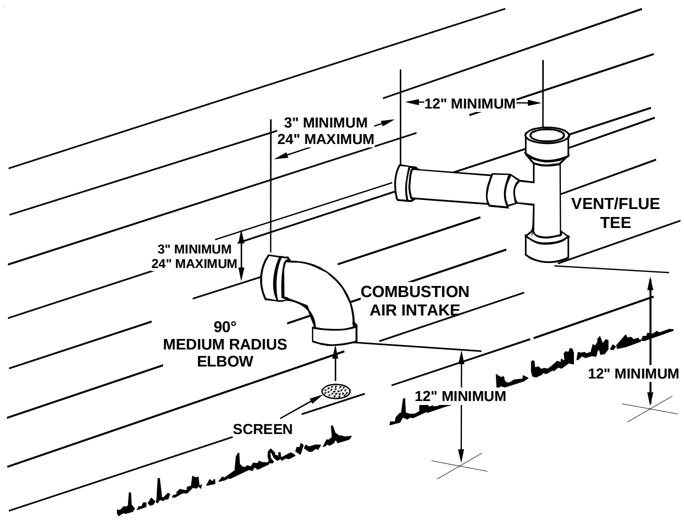
Vertical pipe terminations should be as shown in the following figure. *Refer to Vent/Flue Pipe and Combustion Pipe - Termination Locations* section in this manual or the installation instructions. The penetrations through the roof must be sealed tight with proper flashing such as is used with a plastic plumbing vent.



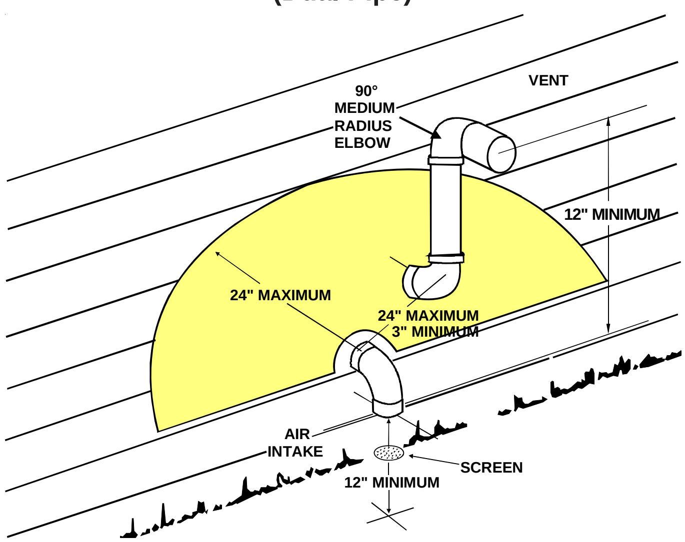
90% Furnace Vertical Terminations (Dual Pipe)

Horizontal terminations should be as shown in the following figure. Refer to *Vent/Flue Pipe and Combustion Pipe - Termination Location* section in this manual or the installation instructions for location restrictions. A 2 3/8" diameter wall penetration is required for 2" diameter pipe while a 3 1/2" diameter hole is required for 3" diameter pipe. To secure the pipe passing through the wall and prohibit damage to piping

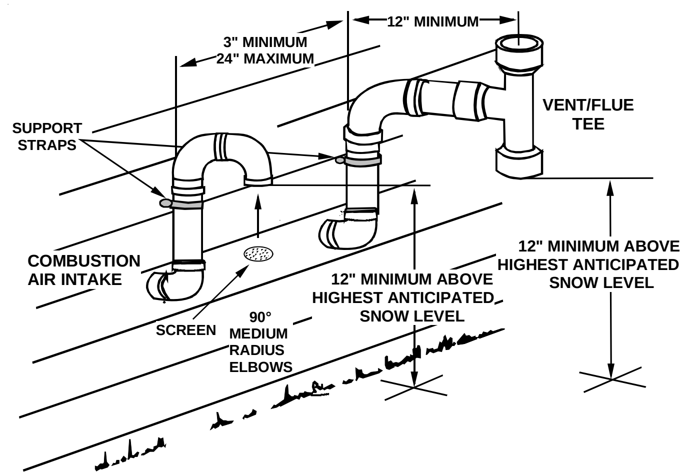
connections, a coupling should be installed on either side of the wall and solvent cemented to a pipe connecting the two couplings. The pipe length should be the wall thickness plus the depth of the socket fittings to be installed on the inside and outside of the wall. The wall penetration should be sealed with silicone caulking material.



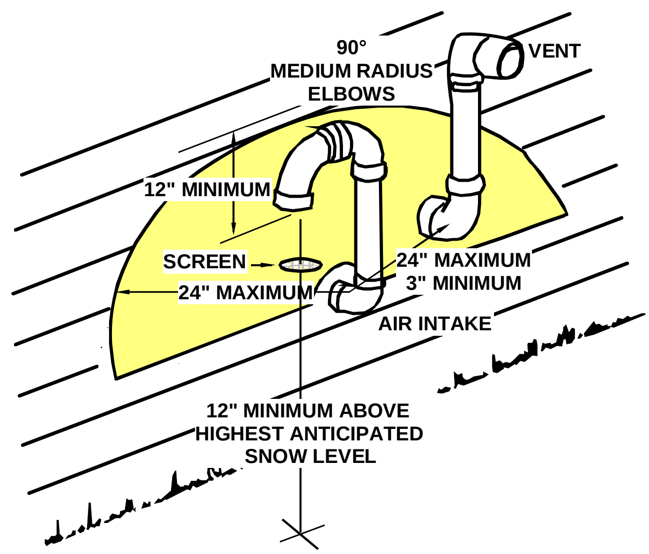
90% Furnace Standard Horizontal Terminations (Dual Pipe)



90% Furnace Alternate Horizontal Vent Termination (Dual Pipe)



90% Furnace Standard Horizontal Terminations Above Anticipated Snow Level (Dual Pipe)



90% Furnace Alternate Horizontal Terminations Above Anticipated Snow Level (Dual Pipe)

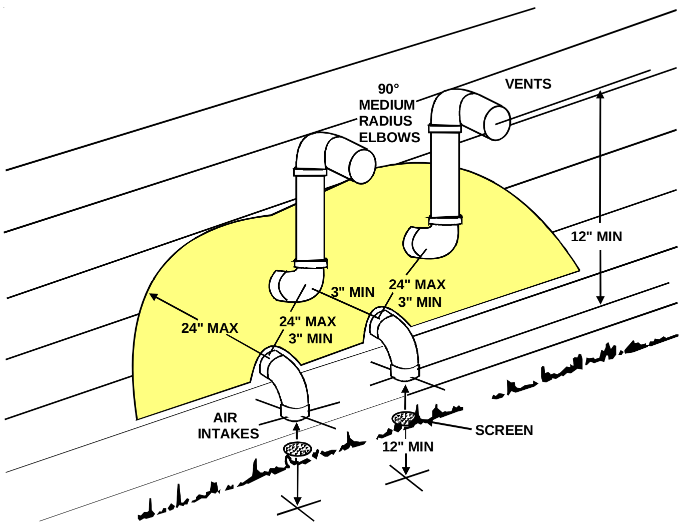
In a basement installation, the pipes may be run between the joist spaces. If the pipes must go below the joist and then up into the last joist space to penetrate the header, two 45° elbows should be used to reach the header rather than two 90° elbows.

Vent/Intake Terminations for Installation of Multiple Direct Vent Furnaces (90% Furnaces Only)

If more than one direct vent furnace is to be installed vertically through a common roof top, maintain the same minimum clearances between the exhaust vent and air intake terminations of adjacent units as with the exhaust vent and air intake terminations of a single unit.

PRODUCT DESIGN

If more than one direct vent furnace is to be installed horizontally through a common side wall, use the alternate termination style and maintain the clearances as shown in the following horizontal venting of multiple units. Always terminate all exhaust vent outlets at the same elevations and always terminate all air intakes at the same elevation.



90% Furnace Horizontal Venting of Multiple Units (Dual Pipe)

CONCENTRIC VENT TERMINATION (90% FURNACES ONLY)

The Concentric Vent Kits HCVK and VCVK are designed to allow the terminations of a direct vent furnace to be "concentrically" vented through a wall (HCVK) or roof (VCVK). These kits allow a single penetration to support terminations for both the vent/flue pipe and the combustion air intake pipe. HCVK is designed for horizontal, through the wall terminations, while the VCVK is designed for vertical, through the roof terminations. The appropriate kit must be used for a given termination placement (horizontal or vertical).

Concentric Vent Kits HVCK and VCVK are suitable for use with the following Amana® brand 90% efficient furnaces:

CONCENTRIC VENT KIT
Used On Models
GUCA / GCCA
GUVA / GCVA
GUSA
GULA
GCLA
GCVA

NOTE: This kit is not certified for, and must not be applied to any furnace not listed in the above table.

Refer to the directions provided with the concentric vent kit for installation specifications.

Condensate Drain Lines and Drain Trap (90% Furnaces Only)

A condensing gas furnace achieves its high level of efficiency by extracting almost all of the heat from the products of combustion and cooling them to the point where condensation takes place. The condensate which is generated must be piped to an appropriate drain location.

In *upright* installations, the furnace's drain hoses may exit either the right or left side of the furnace. **NOTE:** If the alternate vent/flue outlet is utilized in an upright installation, the drain trap and drain connections must be located on the same side as the alternate vent/flue outlet.

In *horizontal* installations, the drain hoses will exit through the bottom (down side) of the unit with the drain trap suspended beneath the furnace. The field-supplied drain system must be in accordance with all local codes and the instructions in the following sections.

WARNING

IN UPRIGHT UPFLOW INSTALLATIONS, THE DRAIN TRAP MUST BE MOUNTED ON THE OPPOSITE SIDE OF THE UNIT FROM THE JUNCTION BOX. THIS WILL REDUCE THE RISK OF WATER REACHING THE JUNCTION BOX IN THE EVENT OF A BLOCKED DRAIN CONDITION. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH DUE TO ELECTRICAL SHOCK.

Follow the bullets listed below when installing the drain system. Refer to the following sections for specific details concerning furnace drain trap installation and drain hose hook ups.

- The drain trap supplied with the furnace must be used.
- The drain line between furnace and drain location must be constructed of 3/4" PVC or CPVC.
- The drain line between furnace and drain location must maintain a 1/4" per foot downward slope toward the drain.
- Do not trap the drain line in any other location than at the drain trap supplied with the furnace.
- Do not route the drain line outside where it may freeze.
- If the drain line is routed through an area which may see temperatures near or below freezing, precautions must be taken to prevent condensate from freezing within the drain line.
- If an air conditioning coil is installed with the furnace, a common drain may be used. An open tee must be installed in the drain line, near the cooling coil, to relieve positive air pressure from the coil's plenum. This is necessary to prohibit any interference with the function of the furnace's drain trap.

PRODUCT DESIGN

UPRIGHT INSTALLATIONS

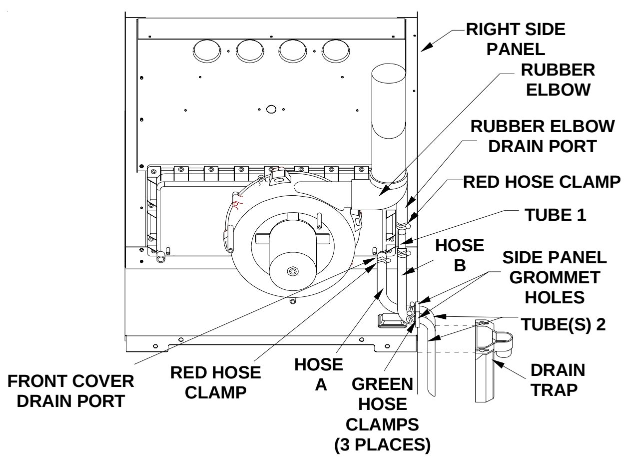
In an upright installation drain hoses are connected to drain ports on the rubber elbow and the recouperator coil front cover. The drain lines are then routed through the right or left side panel and into the drain trap secured to the outside of the cabinet.

NOTE: Refer to *Condensate Drain Lines and Drain Trap - Alternate Vent/Flue Hose Connections* section in this manual or the installation instructions for upright installations using an alternate vent/flue outlet.

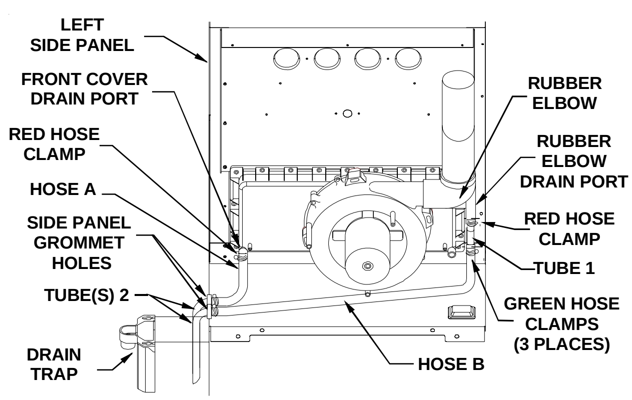
Standard Right or Left Side Drain Hose Connections

Upright installations using the *standard* vent/flue outlet require drain hoses to be connected as shown in the following figures.

NOTE: For left side drainage, grommets will have to be relocated to left side panel.



90% Furnace Upright "Standard" Drain Hose Connections (Right Side)

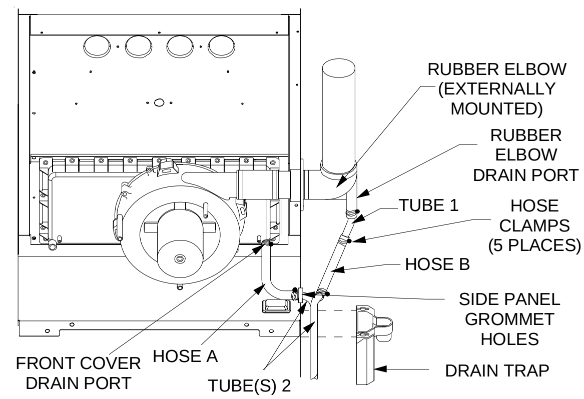


90% Furnace Upright "Standard" Drain Hose Connections (Left Side)

NOTE: Ensure hoses and tubes maintain a downward slope for proper drainage and that they are not kinked or binding.

Alternate Vent/Flue Drain Hose Connections

Upright installations using the *alternate* vent/flue outlet will require "right-side only" drain hoses to be connected as shown in the following figure. Refer to *Vent/Flue Pipe and Combustion Air Pipe* section in this manual or the installation instructions for details on alternate vent/flue pipe connection.



90% Furnace Upright "Alternate" Drain Hose Connections (Right Side Only)

NOTE: Ensure hoses and tubes maintain a downward slope for proper drainage and are not kinked or binding.

For details concerning mounting of the drain trap, refer to the following section.

Upright Drain Trap Mounting (Left or Right Side Panel)

1. Insert drain tubes into drain trap and position the drain trap against the side panel. **NOTE:** Drain tubes must reach the bottom of the drain trap.
2. Secure drain trap to side panel at the mounting holes located below the grommet drain holes.
3. Attach PVC drain line to drain trap outlet with either a 90° elbow or coupling.

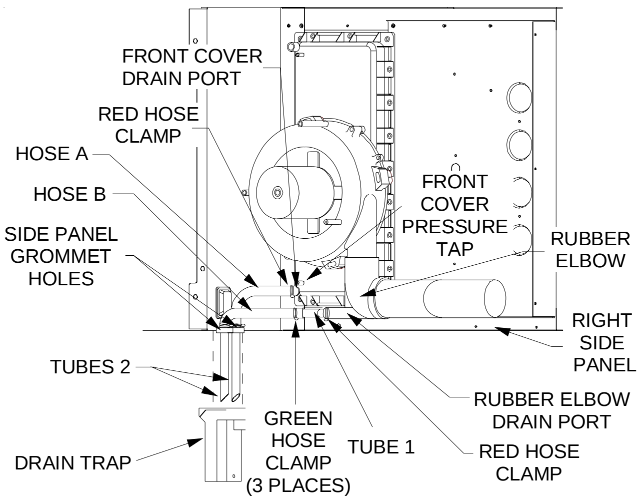
NOTE: Ensure hoses and tubes maintain a downward slope for proper drainage and that they are not kinked or binding.

PRODUCT DESIGN

HORIZONTAL INSTALLATIONS

Right Side Down

Horizontal installations with the right side down require that the drain hoses be connected to the right side front cover drain port and the rubber elbow drain port.



90% Furnace Horizontal Drain Hose Connections (Right Side Down)

NOTE: Ensure hoses and tubes maintain a downward slope for proper drainage and are not kinked or bound.

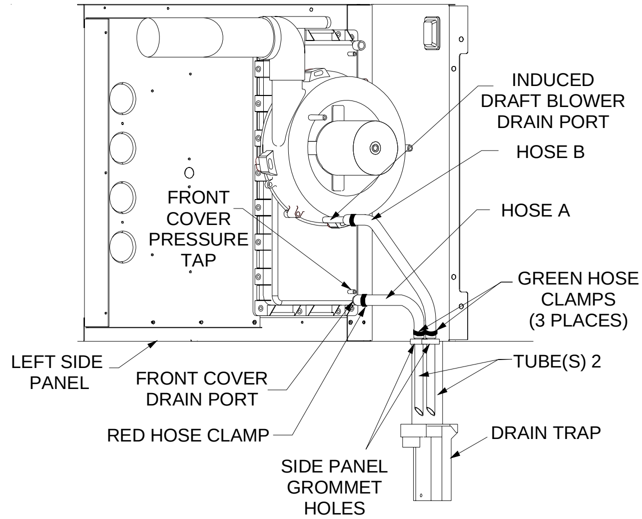
For details concerning mounting of the drain trap, refer to *Condensate Drain Lines and Drain Trap - Horizontal Drain Trap Mounting section* in this manual or the installation instructions.

Left Side Down

Horizontal installations with the left side panel down will require drain hoses to be connected to the left side front cover drain port and the induced draft blower drain port.

NOTE: On upflow models, relocation of the front cover pressure switch hose is required from the right side (as shipped) pressure tap to the left (down) side tap. The pressure switch hose must be connected to the down side to guard against blocked drain conditions. The hose must be cut to appropriate length to minimize sagging.

NOTE: Use RF000142 Drain Coupling Kit for horizontal left applications.



90% Furnace Horizontal Drain Hose Connections (Left Side Down)

NOTE: Ensure hoses and tubes maintain a downward slope for proper drainage and that they are not kinked or binding.

For details concerning mounting of the drain trap, refer to *Condensate Drain Lines and Drain Trap - Horizontal Drain Trap Mounting* in this manual or the installation instructions.

Horizontal Drain Trap Mounting (Left or Right Side Panel)

1. Position the drain trap against side panel with drain tubes inserted into trap. Note that the trap may be orientated with the outlet facing either the furnace's top cover or base pan.
2. Secure drain trap to side panel at the dimples or crosshairs located on either side of the grommet drain holes.
3. Confirm that tubes reach bottom of drain trap and that all hoses maintain a downward slope and are not kinked or binding.
4. Attach PVC drain line to drain trap outlet with either a 90° elbow or coupling.

Gas Supply and Piping

The furnace rating plate includes the approved furnace gas input rating and gas types. The furnace must be equipped to operate on the type of gas applied. This includes any conversion kits required for alternate fuels and/or high altitude.

CAUTION

TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE INLET GAS SUPPLY PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE WITH ALL OTHER HOUSEHOLD GAS FIRED APPLIANCES OPERATING.

PRODUCT DESIGN

Inlet gas supply pressures must be maintained within the ranges specified below. The supply pressure must be constant and available with all other household gas fired appliances operating. The minimum gas supply pressure must be maintained to prevent unreliable ignition. The maximum must not be exceeded to prevent unit overfiring.

Inlet Gas Supply Pressure	
Natural Gas	Minimum: 5.0" W.C. Maximum :10.0" W.C.
Propane Gas	Minimum:11.0" W.C. Maximum :13.0" W.C.

HIGH ALTITUDE DERATE

When this furnace is installed at high altitude, the appropriate High Altitude orifice kit must be applied. This is required due to the natural reduction in the density of both the gas fuel and combustion air as altitude increases. The kit will provide the proper design certified input rate within the specified altitude range.

High altitude kits are purchased according to the installation altitude and usage of either natural or propane gas. Refer to the product Specification Sheet or Technical Manual for a tabular listing of appropriate altitude ranges and corresponding manufacturer's high altitude (Natural, Propane gas, and/or Pressure Switch) kits.

Do **not** derate the furnace by adjusting the manifold pressure to a lower pressure than specified on the furnace rating plate. The combination of the lower air density and a lower manifold pressure will prohibit the burner orifice from drawing the proper amount of air into the burner. This may cause incomplete combustion, flashback, and possible yellow tipping.

In some areas the gas supplier may artificially derate the gas in an effort to compensate for the effects of altitude. If the gas is artificially derated, the appropriate orifice size must be determined based upon the BTU/ft^3 content of the derated gas and the altitude. Refer to the National Fuel Gas Code, NFPA 54/ANSI Z223.1, and information provided by the gas supplier to determine the proper orifice size.

A different pressure switch may be required at high altitude regardless of the BTU/ft^3 content of the fuel used. Refer to the product Specification Sheet or Technical Manual for a tabular listing of appropriate altitude ranges and corresponding manufacturer's pressure switch kits.

Propane Gas Conversion

WARNING

POSSIBLE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH MAY OCCUR IF THE CORRECT CONVERSION KITS ARE NOT INSTALLED. THE APPROPRIATE KITS MUST BE APPLIED TO INSURE SAFE AND PROPER FURNACE OPERATION. ALL CONVERSIONS MUST BE PERFORMED BY A QUALIFIED INSTALLER OR SERVICE AGENCY.

This unit is configured for natural gas. The appropriate manufacturer's propane gas conversion kit, must be applied for propane gas installations. Refer to the "propane gas and/or High Altitude Installations" section for details.

Gas Valve

This unit is equipped with a 24 volt gas valve controlled during furnace operation by the integrated control module. As shipped, the valve is configured for natural gas. The valve is field convertible for use with propane gas by using the appropriate propane gas conversion kit. Taps for measuring the gas supply pressure and manifold pressure are provided on the valve.

The gas valve has a manual ON/OFF control located on the valve itself. This control may be set only to the "ON" or "OFF" position. Refer to the *Lighting Instructions Label* or the *"Putting the Furnace Into Operation"* section of this manual or the installation instructions for use of this control during start up and shut down periods.

GAS PIPING CONNECTIONS

CAUTION

TO AVOID POSSIBLE UNSATISFACTORY OPERATION OR EQUIPMENT DAMAGE DUE TO UNDERFIRING OF EQUIPMENT, USE THE PROPER SIZE OF NATURAL/PROPANE GAS PIPING NEEDED WHEN RUNNING PIPE FROM THE METER/TANK TO THE FURNACE.

When sizing a trunk line, be sure to include all appliances which will operate simultaneously when sizing a trunk line.

The gas piping supplying the furnace must be properly sized based on the gas flow required, specific gravity of the gas, and length of the run. The gas line installation must comply with local codes, or in their absence, with the latest edition of the National Fuel Gas Code, NFPA 54/ANSI Z223.1.

Natural Gas Capacity of Pipe
In Cubic Feet of Gas Per Hour (CFH)

Length of Pipe in Feet	Nominal Black Pipe Size 1/2"	3/4"	1"	1 1/4"	1 1/2"
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	980
40	63	130	245	500	760
50	56	115	215	440	670
60	50	105	195	400	610
70	46	96	180	370	560
80	43	90	170	350	530
90	40	84	160	320	490
100	38	79	150	305	460

(Pressure 0.5 psig or less and pressure drop of 0.3" W.C.; Based on 0.60 Specific Gravity Gas)

$$CFH = \frac{\text{BTUH Furnace Input}}{\text{Heating Value of Gas (BTU/Cubic Foot)}}$$

PRODUCT DESIGN

To connect the furnace to the building's gas piping, the installer must supply a ground joint union, drip leg, manual shutoff valve, and line and fittings to connect to gas valve. In some cases, the installer may also need to supply a transition piece from 1/2" pipe to a larger pipe size.

The following stipulations apply when connecting gas piping. Refer to the following figures for typical gas line connections to the furnace.

1. Use black iron or steel pipe and fittings for the building piping.
2. Use pipe joint compound on male threads only. Pipe joint compound must be resistant to the action of the fuel used.
3. Use ground joint unions.
4. Install a drip leg to trap dirt and moisture before it can enter the gas valve. The drip leg must be a minimum of three inches long.
5. Install a 1/8" NPT pipe plug fitting, accessible for test gage connection, immediately upstream of the gas supply connection to the furnace.
6. Use two pipe wrenches when making connection to the gas valve to keep it from turning. The orientation of the gas valve on the manifold must be maintained as shipped from the factory.
7. Install a manual shutoff valve between the gas meter and unit within six feet of the unit. If a union is installed, the union must be downstream of the manual shutoff valve, between the shutoff valve and the furnace.
8. Tighten all joints securely.
9. Connect the furnace to the building piping by one of the following methods:
   - Rigid metallic pipe and fittings.
   - Semi-rigid metallic tubing and metallic fittings. Alu minum alloy tubing must not be used in exterior locations. In order to seal the grommet cabinet penetration, rigid pipe must be used to reach the outside of the cabinet. A semi-rigid connector to the gas piping may be used from there.
10. Use listed gas appliance connectors in accordance with their instructions. Connectors must be fully in the same room as the furnace.
11. Protect connectors and semi-rigid tubing against physical and thermal damage when installed. Ensure aluminum-alloy tubing and connectors are coated to protect against external corrosion when in contact with masonry, plaster, or insulation, or subjected to repeated wetting by liquids such as water (except rain water), detergents, or sewage.

⚠ CAUTION

EDGES OF SHEET METAL HOLES MAY BE SHARP. USE GLOVES A PRECAUTION WHEN REMOVING HOLE PLUGS.

Direct/Standard Inlet Piping

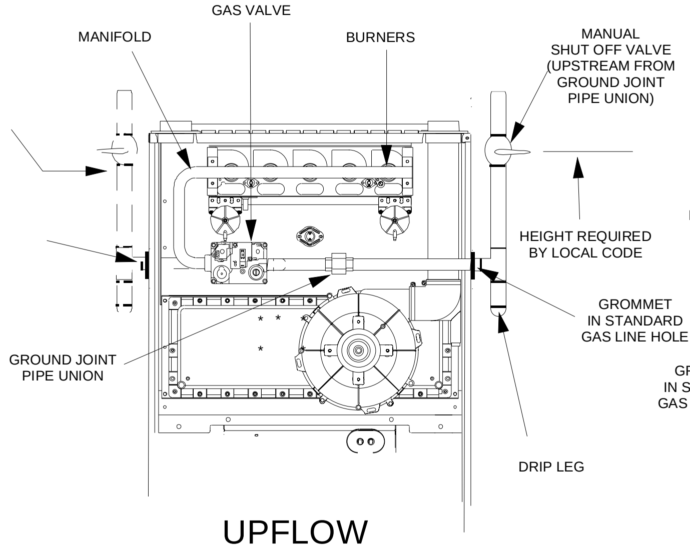
When gas piping enters *directly* to the gas valve through the *standard* inlet hole (upflow through the right side panel), the installer must supply straight pipe with a ground joint union to reach the exterior of the furnace. **NOTE:** The rigid pipe must be long enough to reach the outside of the cabinet to seal the grommet cabinet penetration on the 90% & 95% furnaces. A semi-rigid connector to the gas piping can be used outside the cabinet per local codes.

Indirect/Alternate Inlet Piping

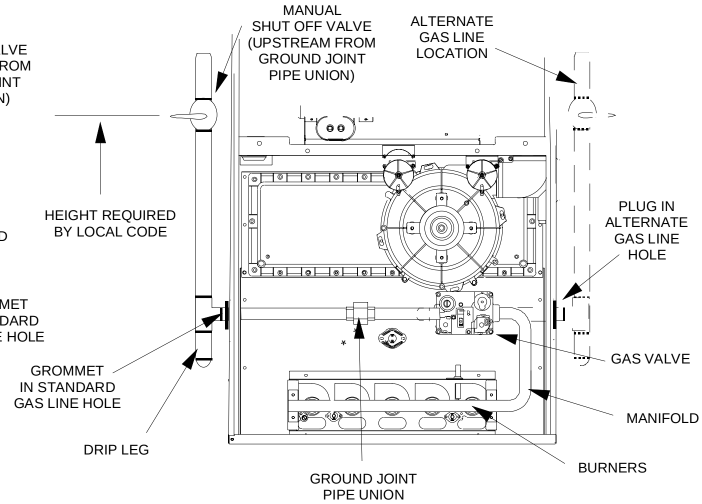
When gas piping enters *indirectly* to the gas valve through the *alternate* gas inlet hole the installer must supply the following fittings (starting from the gas valve) to reach the outside of the cabinet (**NOTE:** On the 90% & 95% furnaces the installer must swap the alternate inlet hole plug with the standard inlet grommet in order to seal the cabinet):

- Coupling.
- 90 degree elbow.
- 2 inch close nipple.
- 90 degree elbow.
- Straight pipe, with a ground joint union, to reach the exterior of the furnace. **NOTE:** The rigid pipe must be long enough to reach the outside of the cabinet so as to seal the grommet cabinet penetration on the 90% & 95% furnaces. A semi-rigid connector to the gas piping can be used outside the cabinet per local codes.

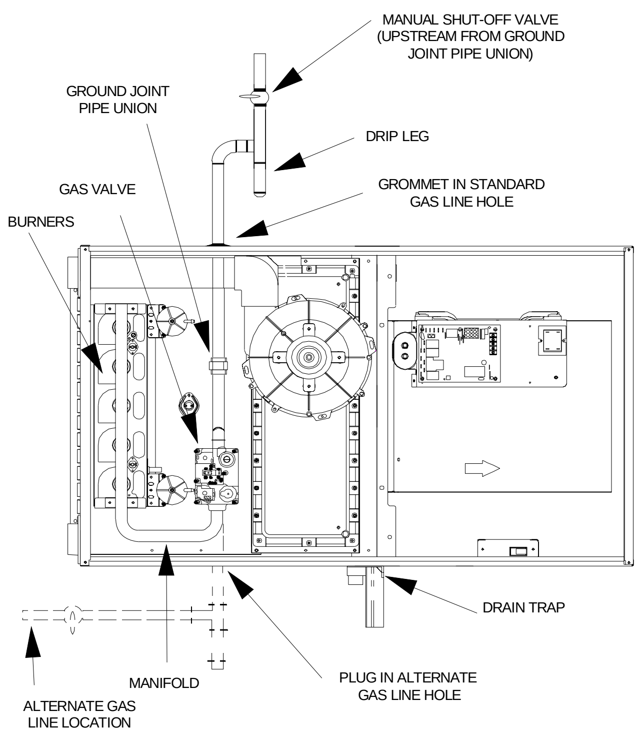
PRODUCT DESIGN



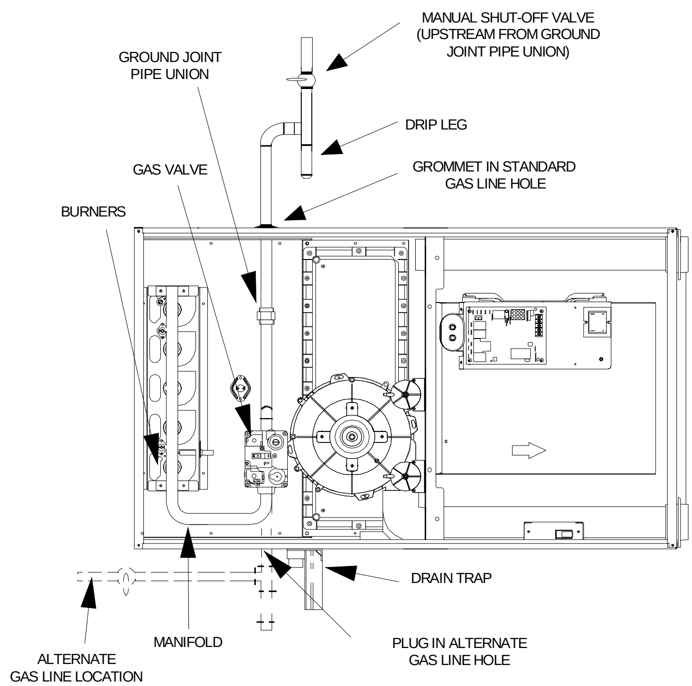
UPFLOW



COUNTERFLOW



HORIZONTAL(UPFLOW MODEL)



HORIZONTAL(COUNTERFLOW)

NOTES: 1. WHEN GAS LINE IS IN THE ALTERNATE LOCATION, SWAP THE POSITION OF THE PLUG AND GROMMET.

2. DRIP LEG MAY TERMINATE WITH A 1/2" X 1/8" PIPE PLUG TO ACCOMMODATE LINE GAS PRESSURE MEASUREMENT.

Gas Piping Connections
(90% Furnace Shown, 80% Furnace Similar)

PRODUCT DESIGN

Gas Piping Checks

Before placing unit in operation, leak test the unit and gas connections.

WARNING

TO AVOID THE POSSIBILITY OF EXPLOSION OR FIRE, NEVER USE A MATCH OR OPEN FLAME TO TEST FOR LEAKS.

Check for leaks using an approved chloride-free soap and water solution, an electronic combustible gas detector, or other approved testing methods.

NOTE: Never exceed specified pressures for testing. Higher pressure may damage the gas valve and cause subsequent overfiring, resulting in heat exchanger failure. Disconnect this unit and shutoff valve from the gas supply piping system before pressure testing the supply piping system with pressures in excess of 1/2 psig (3.48 kPa). Isolate this unit from the gas supply piping system by closing its external manual gas shutoff valve before pressure testing supply piping system with test pressures equal to or less than 1/2 psig (3.48 kPa).

Propane Gas Tanks and Piping

WARNING

PROPANE GAS IS HEAVIER THAN AIR AND ANY LEAKING GAS CAN SETTLE IN ANY LOW AREAS OR CONFINED SPACES. TO PREVENT PROPERTY DAMAGE, PERSONAL INJURY, OR DEATH DUE TO FIRE OR EXPLOSION CAUSED BY A PROPANE GAS LEAK, INSTALL A GAS DETECTION WARNING DEVICE.

A gas detecting warning system is the only reliable way to detect a propane gas leak. Iron oxide (rust) can reduce the level of odorant in propane gas. Do not rely on your sense of smell. Contact a local propane gas supplier about installing a gas detecting warning system. If the presence of gas is suspected, follow the instructions on *Pages 20-25* of this manual.

All propane gas equipment must conform to the safety standards of the National Board of Fire Underwriters, NBFU Manual 58.

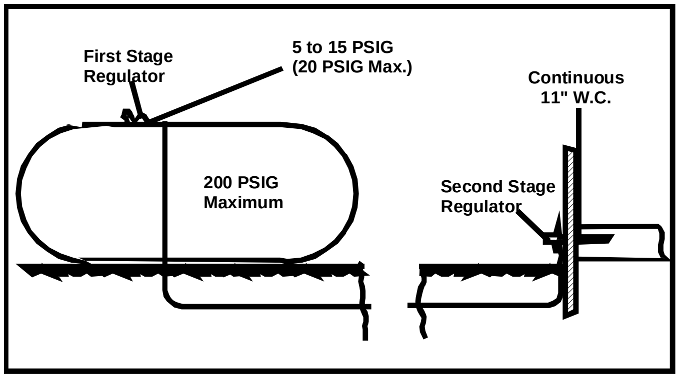
For satisfactory operation, propane gas pressure must be 11 inch WC at the furnace manifold with all gas appliances in operation. Maintaining proper gas pressure depends on three main factors:

1. Vaporization rate, depending on temperature of the liquid, and “wetted surface” area of the container or containers.
2. Proper pressure regulation. (Two-stage regulation is recommended for both cost and efficiency).
3. Pressure drop in lines between regulators, and between second stage regulator and the appliance. Pipe size will depend on length of pipe run and total load of all appliances.

Complete information regarding tank sizing for vaporization, recommended regulator settings, and pipe sizing is available from most regulator manufacturers and propane gas suppliers.

Since propane gas will quickly dissolve white lead and most standard commercial compounds, special pipe dope must be used. Shellac-based compounds resistant to the actions of liquefied petroleum gases such as Gasolac®, Stalactic®, Clyde’s® or John Crane® are satisfactory.

Refer to the following illustration for typical propane gas installations and piping.



Typical Propane Gas Installation

WARNING

IF THE GAS FURNACE IS INSTALLED IN A BASEMENT, AN EXCAVATED AREA OR A CONFINED SPACE, IT IS STRONGLY RECOMMENDED TO CONTACT A PROPANE SUPPLIER TO INSTALL A GAS DETECTING WARNING DEVICE IN CASE OF A GAS LEAK.

- SINCE PROPANE GAS IS HEAVIER THAN AIR, ANY LEAKING GAS CAN SETTLE IN ANY LOW AREAS OR CONFINED SPACES.
- PROPANE GAS ODORANT MAY FADE, MAKING THE GAS UNDETECTABLE EXCEPT WITH A WARNING DEVICE.

WARNING

AN UNDETECTED GAS LEAK WILL CREATE A DANGER OF EXPLOSION OR FIRE. IF THE PRESENCE OF GAS IS SUSPECTED, FOLLOW THE INSTRUCTIONS ON THE COVER OF THIS MANUAL. FAILURE TO DO SO COULD RESULT IN **SERIOUS PERSONAL INJURY OR DEATH**.

PRODUCT DESIGN

⚠ WARNING

IF THE INFORMATION IN THESE INSTRUCTIONS IS NOT FOLLOWED EXACTLY, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.

– DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

– **WHAT TO DO IF YOU SMELL GAS**:

- DO NOT TRY TO LIGHT ANY APPLIANCE.
- DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
- IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.
- IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

– INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

Sizing Between First and Second Stage Regulator*
Maximum Propane Capacities listed are based on 2 psig pressure drop at 10 psig setting.
Capacities in 1,000 BTU/hour.

Pipe or Tubing Length, Feet	Tubing Size, O.D. Type L					Nominal Pipe Size Schedule 40	
	3/8"	1/2"	5/8"	3/4"	7/8"	1/2"	3/4"
10	730	1,700	3,200	5,300	8,300	3,200	7,500
20	500	1,100	2,200	3,700	5,800	2,200	4,200
30	400	920	2,000	2,900	4,700	1,800	4,000
40	370	850	1,700	2,700	4,100	1,600	3,700
50	330	770	1,500	2,400	3,700	1,500	3,400
60	300	700	1,300	2,200	3,300	1,300	3,100
80	260	610	1,200	1,900	2,900	1,200	2,600
100	220	540	1,000	1,700	2,600	1,000	2,300
125	200	490	900	1,400	2,300	900	2,100
150	190	430	830	1,300	2,100	830	1,900
175	170	400	780	1,200	1,900	770	1,700
200	160	380	730	1,100	1,800	720	1,500

To convert to capacities at 15 psig settings - multiply by 1.130
To convert to capacities at 5 psig settings - multiply by 0.879

Sizing Between Single or Second Stage Regulator and Appliance*
Maximum Propane Capacities Listed are Based on 1/2" W.C. pressure drop at 11" W.C. setting.
Capacities in 1,000 BTU/hour.

Pipe or Tubing Length, Feet	Tubing Size, O.D. Type L						Nominal Pipe Size Schedule 40				
	3/8"	1/2"	5/8"	3/4"	7/8"	1-1/8"	1/2"	3/4"	1"	1-1/4"	1-1/2"
10	39	92	199	329	501	935	275	567	1,071	2,205	3,307
20	26	62	131	216	346	630	189	393	732	1,496	2,299
30	21	50	107	181	277	500	152	315	590	1,212	1,858
40	19	41	90	145	233	427	129	267	504	1,039	1,559
50	18	37	79	131	198	376	114	237	448	913	1,417
60	16	35	72	121	187	340	103	217	409	834	1,275
80	13	29	62	104	155	289	89	185	346	724	1,066
100	11	26	55	90	138	255	78	162	307	630	976
125	10	24	48	81	122	224	69	146	275	567	866
150	9	21	43	72	109	202	63	132	252	511	787
200	8	19	39	66	100	187	54	112	209	439	665
250	8	17	36	60	93	172	48	100	185	390	590

*Data in accordance with NFPA pamphlet NO. 54

Propane Gas Piping Charts

When installing a propane storage tank, the contractor must consider proper tank sizing, safety, efficiency, ground characteristics and aesthetics. For a residential customer, the size may range from 100-1,000 gallons, depending on household use. Typically, a 500 gallon tank is ample for an average four-bedroom home. However, it is best to consult your local propane supplier to ensure the proper sizing for propane storage requirements. Determining the correct tank size for each household is a function of demand, economy, efficiency and convenience. It is a process that requires cooperation between the propane supplier and customer.

Electrical Connections

⚠ WARNING

TO AVOID THE RISK OF ELECTRICAL SHOCK, WIRING TO THE UNIT MUST BE POLARIZED AND GROUNDED.

⚠ WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

⚠ CAUTION

LABEL ALL WIRES PRIOR TO DISCONNECTION WHEN SERVICING CONTROLS. WIRING ERRORS CAN CAUSE IMPROPER AND DANGEROUS OPERATION. VERIFY PROPER OPERATION AFTER SERVICING.

WIRING HARNESS

The wiring harness is an integral part of this furnace. Field alteration to comply with electrical codes should not be required. Wires are color and number coded for identification purposes. Refer to the wiring diagram for wire routings. If any of the original wire as supplied with the furnace must be replaced, it must be replaced with wiring material having a temperature rating of at least 105° C. Any replacement wiring must be copper conductor.

115 VOLT LINE CONNECTIONS

Before proceeding with electrical connections, ensure that the supply voltage, frequency, and phase correspond to that specified on the unit rating plate. Power supply to the furnace must be N.E.C. Class 1, and must comply with all applicable codes. The furnace must be electrically grounded in accordance with local codes or, in their absence, with the latest edition of The National Electric Code, ANSI NFPA 70 and/or The Canadian Electric Code CSA C22.1.

Use a separate fused branch electrical circuit containing properly sized wire, and fuse or circuit breaker. The fuse or circuit breaker must be sized in accordance with the maximum overcurrent protection specified on the unit rating plate. An electrical disconnect must be provided at the furnace location.

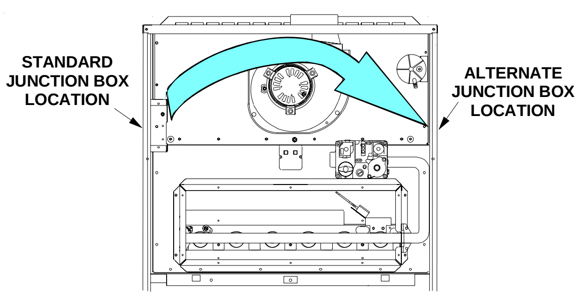
NOTE: Line polarity must be observed when making field connections.

> ⚠ **WARNING**
>
> IN 90% FURNACE UPRIGHT UPFLOW INSTALLATIONS, THE DRAIN TRAP MUST BE MOUNTED ON THE OPPOSITE SIDE OF THE UNIT FROM THE JUNCTION BOX. THIS WILL REDUCE THE RISK OF WATER REACHING THE JUNCTION BOX IN THE EVENT OF A BLOCKED DRAIN CONDITION.

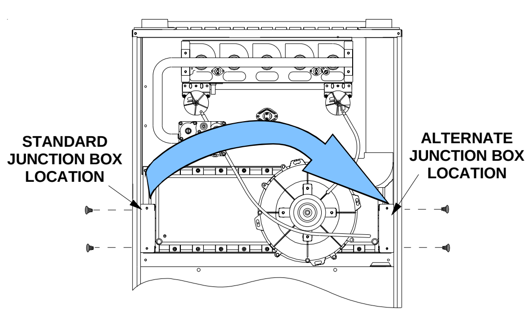
Connect hot, neutral, and ground wires as shown in the wiring diagram located on the unit's blower door. Line polarity must be observed when making field connections. Line voltage connections can be made through either the right or left side panel.

The 80% and 90% furnaces are shipped configured for a left side electrical connection with the junction box located inside the burner compartment on 80% furnaces and inside the blower compartment on 90% furnaces. To make electrical connections through the opposite side of the furnace, the junction box must be relocated to the other side of the burner compartment on 80% furnaces and to the other side of the blower compartment on 90% furnaces prior to making electrical connections, refer to the following figures.

> ⚠ **WARNING**
>
> EDGES OF SHEET METAL HOLES MAY BE SHARP. USE GLOVES AS A PRECAUTION WHEN REMOVING HOLE PLUGS.



80% Furnace Junction Box Relocation



90% Furnace Junction Box Relocation

NOTE: Wire routing must not interfere with circulator blower operation, filter removal, or routine maintenance.

> ⚠ **WARNING**
>
> TO AVOID THE RISK OF INJURY, ELECTRICAL SHOCK OR DEATH, THE FURNACE MUST BE ELECTRICALLY GROUNDED IN ACCORDANCE WITH LOCAL CODES OR, IN THEIR ABSENCE, WITH THE LATEST EDITION OF THE NATIONAL ELECTRIC CODE.

115 VOLT LINE CONNECTION OF ACCESSORIES (HUMIDIFIER AND ELECTRONIC AIR CLEANER)

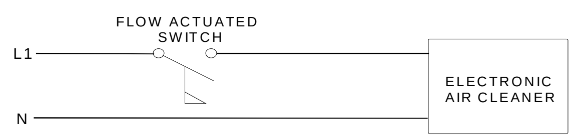
> ⚠ **WARNING**
>
> **HIGH VOLTAGE**
> DISCONNECT **ALL** POWER BEFORE SERVICING OR CHANGING ANY ELECTRICAL WIRING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

All 80% & 90% furnaces, except the 80% GUIB & GCIB model furnaces, have an integrated ignition control that is equipped with line voltage accessory terminals for controlling power to an optional field-supplied humidifier and/or electronic air cleaner.

Accessory Load Specifications	
Humidifier	1.0 Amp maximum at 120 VAC
Electronic Air Cleaner	1.0 Amp maximum at 120 VAC

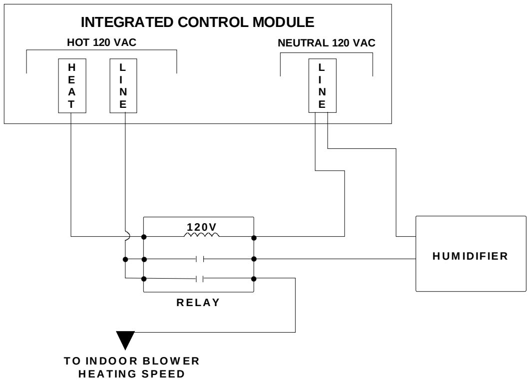
Turn OFF power to the furnace before installing any accessories. Follow the humidifier or air cleaner manufacturers' instructions for locating, mounting, grounding, and controlling these accessories.

Refer to the following two figures for installation of either an Electronic Air Cleaner or Humidifier on GUIB or GCIB model furnaces that have a WR50A52 ignition control.



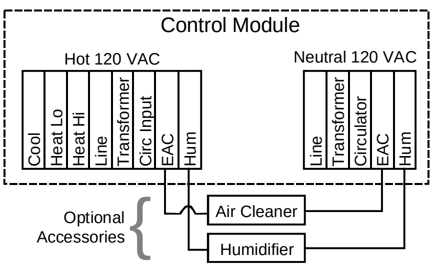
Electronic Air Cleaner Wiring (GUIB/GCIB with WR50A52 Ignition Control)

PRODUCT DESIGN

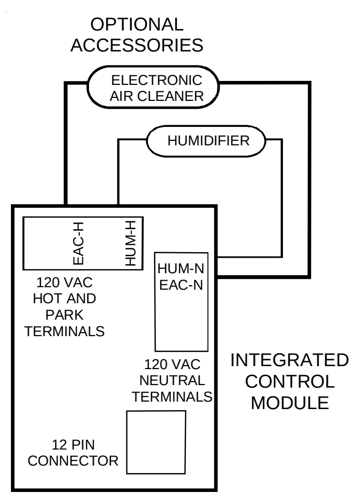


Humidifier Wiring
(GUIB/GCIB with WR50A52 Ignition Control)

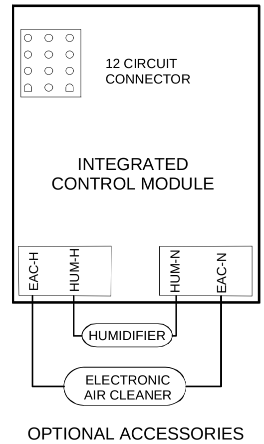
On all other 80% & 90% furnaces, accessory wiring connections are to be made through the 1/4" quick connect terminals provided on the furnace integrated control module. The Humidifier and Electronic Air Cleaner hot and neutral terminals are identified as HUM and EAC. All field wiring must conform to applicable codes. Connections should be made as shown below.



Accessory Wiring
(WR50A51 Ignition Control Shown,
WR50A50 & HSI 1-1A Ignition Controls Similar)



Accessory Wiring
(WR50A55, WR50A65, WR50T55
Ignition Control Shown,
HSI-2 Ignition Control Similar)



Accessory Wiring
(WR50M61 & 50V61 Ignition Control)

If it is necessary for the installer to supply additional line voltage wiring to the inside of the furnace, the wiring must conform to all local codes, and have a minimum temperature rating of 105°C. All line voltage wire splices must be made inside the furnace junction box.

The integrated control module humidifier terminals (HUM) are energized with 115 volts whenever the induced draft blower is energized. The integrated control module electronic air cleaner terminals (EAC) are energized with 115 volts whenever the circulator blower is energized on all single stage ignition controls.

NOTE: The EAC (Electronic Air Cleaner) terminals on the two-stage variable speed integrated control module (50A51-225 used on GUIV-CA/DX models & 50A51-235 used on GUVA-AX models) will not energize when "G" from the thermostat is connected to "G" on the Air Circulator Motor Interface Board. To energize the EAC terminals, the "G" wire from the thermostat must be connected directly to the "G" terminal on the two-stage integrated control module.

24 VOLT THERMOSTAT WIRING

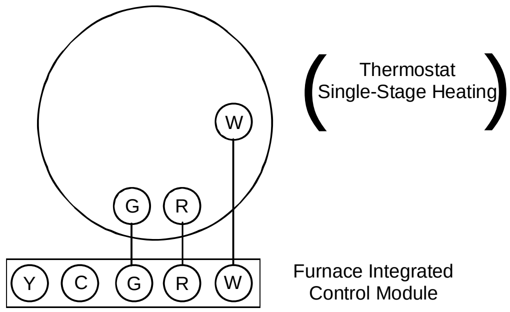
NOTE: Low voltage connections can be made through either the right or left side panel. Wire routing must not interfere with circulator blower operation, filter removal, or routine maintenance.

A 40 V.A. transformer and an integrated electronic control are built into the furnace to allow use with most cooling equipment. Consult the wiring diagram, located in the Technical Manual or on the blower door for further details of 115 Volt and 24 Volt wiring.

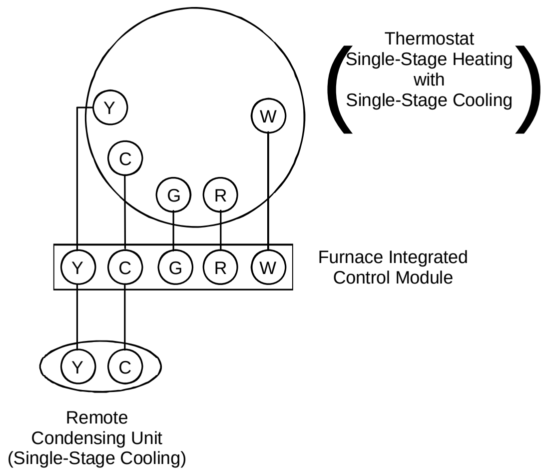
Thermostat Wiring - 80% & 90% Single-Stage Furnaces

The single stage furnace will have a "W" terminal and will use a single stage thermostat. The following drawing illustrates the typical field wiring for a heat only single stage system and a single stage heating/single stage cooling system. Refer to the following figures for proper connections to the integrated control module.

PRODUCT DESIGN



Single-Stage Heating Only

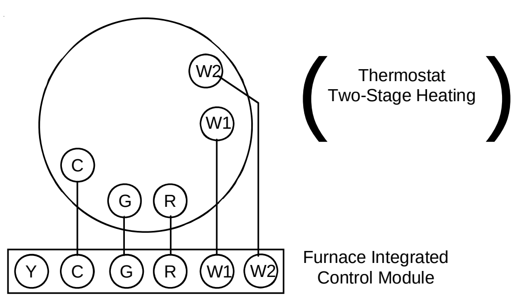


Single-Stage Heating with Single-Stage Cooling

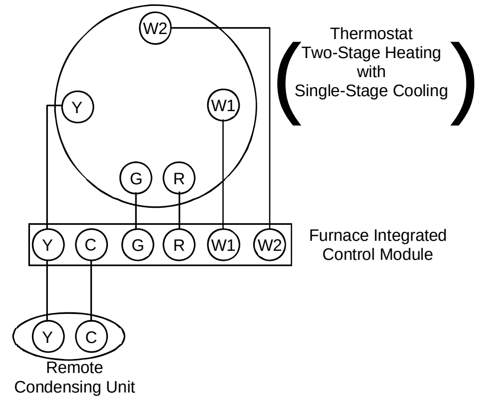
Typical Field Wiring for Single-Stage Gas Furnaces (24 VAC Control Circuit)

Thermostat Wiring - 80% GUIS, GCIS & 90% GUSA-BX/ CX Two-Stage Furnaces

As a two-stage furnace, the furnace's integrated control module provides terminals for both "W1" and "W2" and "Y" thermostat connections. This allows the furnace to support the following system applications: 'Two-Stage Heating Only' or 'Two-Stage Heating with Single-Stage Cooling'. Refer to the following figures for proper connections to the integrated control module.

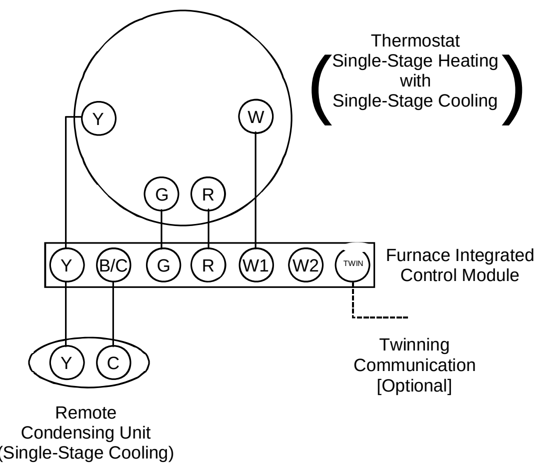


Two-Stage Heating Only



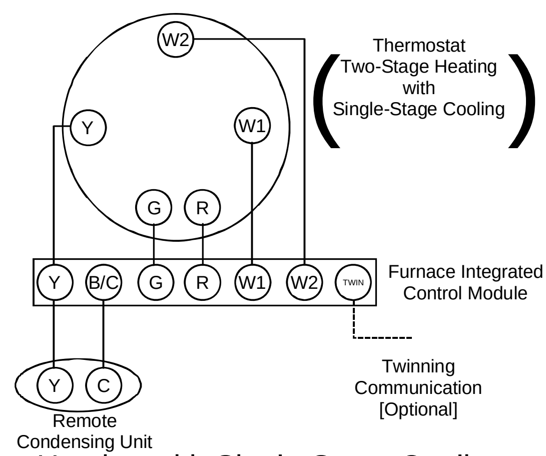
Two-Stage Heating with Single-Stage Cooling

Typical Field Wiring for GUIS and GCIS Two-Stage Gas Furnaces (24 VAC Control Circuit)



Single-Stage Heating with Single-Stage Cooling

NOTE: To apply a single-stage heating thermostat, the thermostat selector jumper on the integrated control module *must* be set on single stage.



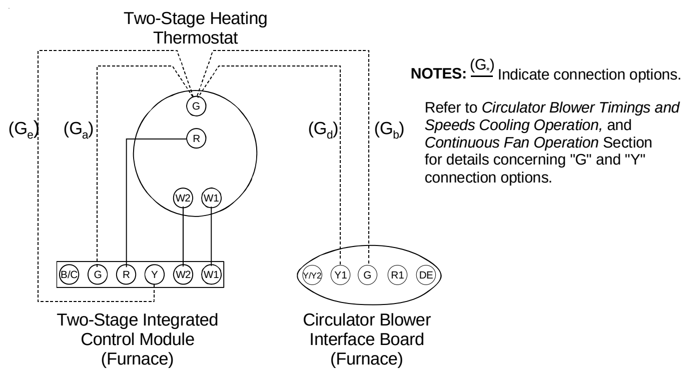
Two-Stage Heating with Single-Stage Cooling

Typical Field Wiring for GUSA-BX Two-Stage Gas Furnaces (24VAC Control CIrcuit)

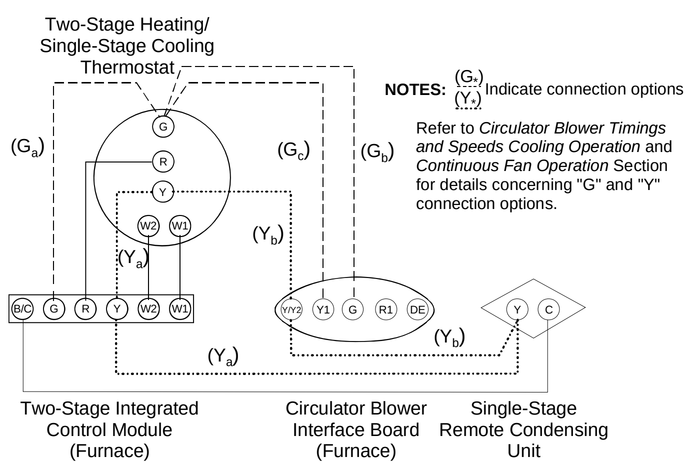
PRODUCT DESIGN

Thermostat Wiring - 80% GUIV-CA/DX & 90% GUVA-AX Two-Stage Variable Speed Furnaces

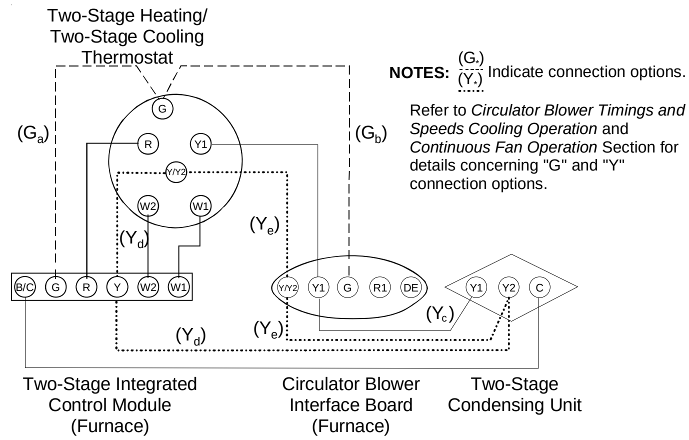
As a two-stage furnace, the furnace's integrated control module and/or circulator blower interface board provide terminals for both "W1" and "W2", and "Y1" and "Y/Y2" thermostat connections. This allows the furnace to support the following system applications: 'Two-Stage Heating Only', 'Two-Stage Heating with Single-Stage Cooling', and 'Two-Stage Heating with Two-Stage Cooling'. Refer to the following figures and also the table on the following page for proper connections to the integrated control module and/or circulator blower interface board. Options applicable to the connection of "Y" and "G" from the thermostat are discussed in *Circulator Blower Timings* and *Continuous Fan Operation* section of this manual.



Two-Stage Heating Only Application



Two-Stage Heating with Single-Stage Cooling

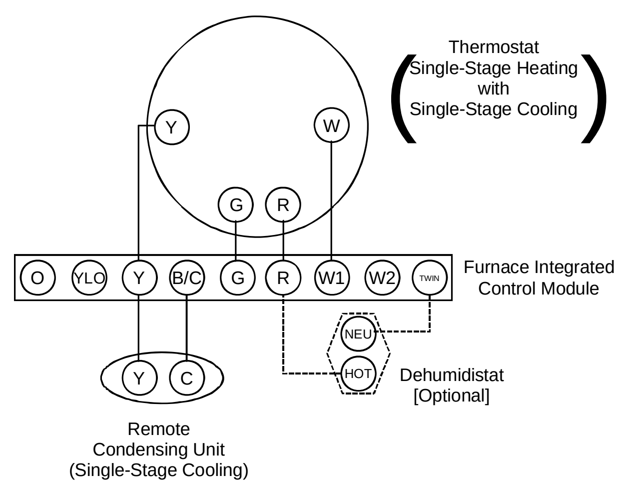


Two-Stage Heating with Two-Stage Cooling

Typical Field Wiring for GUIV-CA/DX & GUVA-AX Two-Stage Variable Speed Gas Furnaces (24VAC Control Circuit)

Thermostat Wiring - 90% GUVA-BX/CX Two-Stage Variable Speed Furnaces

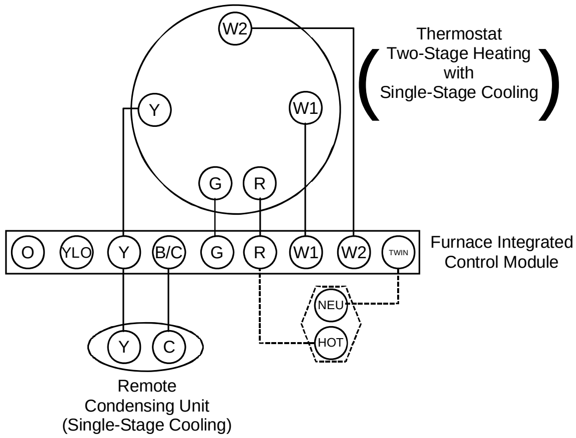
As a two-stage furnace, the furnace's integrated control module and/or circulator blower interface board provide terminals for both "W1" and "W2", and "YLO" and "Y" thermostat connections. This allows the furnace to support the following system applications: 'Two-Stage Heating Only', 'Two-Stage Heating with Single-Stage Cooling', and 'Two-Stage Heating with Two-Stage Cooling'. Refer to the following figures for proper connections to the integrated control module and/or circulator blower interface board.



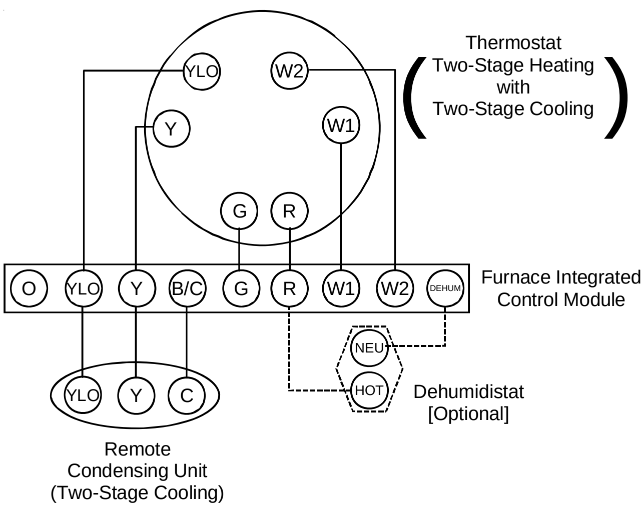
Single-Stage Heating with Single-Stage Cooling

NOTE: To apply a single-stage heating thermostat, the thermostat selector jumper on the integrated Control module *must* be set on single stage.

PRODUCT DESIGN



Two-Stage Heating with Single-Stage Cooling

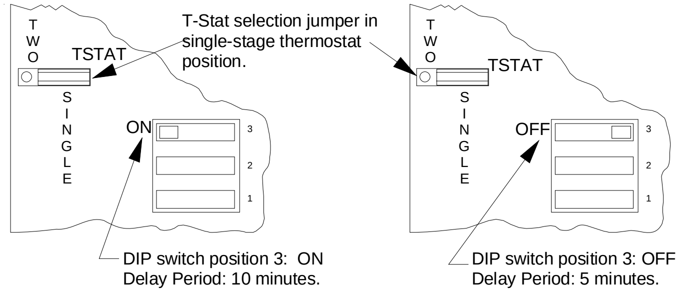


Two-Stage Heating with Two-Stage Cooling

Typical Field Wiring for GUVA-BX/CX Two-Stage Variable Speed Gas Furnaces (24VAC Control Circuit)

Single-Stage Thermostat Application - 90% GUSA-BX/CX Two-Stage and GUVA-BX/CX Two-Stage Variable Speed Models Only

A single-stage thermostat with only one heating stage can be used to control this furnace. The application of a single-stage thermostat does not offer "true" thermostat-driven two-stage operation, but provides a *timed* transition from low to high fire. The furnace will run on low stage for a fixed period of time before stepping up to high stage to satisfy the thermostat's call for heat. The delay period prior to stepping up can be set at either 5 or 10 minutes through the DIP switch adjacent to the Heat Off delay DIP switches on the integrated control module. To use a single-stage thermostat, turn off power to the furnace, move the thermostat selection jumper on the integrated control module from the "two-stage" position to the "single-stage" position, turn power back on. Refer to the following figures.



Single-Stage Thermostat Application (GUSA-BX/CX and GUVA-BX/CX Models)

24 Volt Dehumidistat Wiring - Typical Field Wiring for 80% GUIV-CA/DX & 90% GUVA-AX/BX Two-Stage Variable Speed Gas Furnaces

The optional usage of a dehumidistat allows the furnace's circulator blower to operate at a slightly lower speed during a combined thermostat call for cooling and dehumidistat call for dehumidification. This lower blower speed enhances dehumidification of the conditioned air as it passes through the AC coil. For proper function, a dehumidistat applied to this furnace must operate on 24 VAC and utilize a switch which *opens on humidity rise.*

To install/connect a dehumidistat:

1. Turn OFF power to furnace.
2. Secure the dehumidistat neutral wire (typically the white lead) to the screw terminal marked "DEHUM" on the furnace's circulator blower interface board on GUIV-CA/DX & GUVA-AX models or the furnace's integrated control module on GUIV-FX, GUVA-BX/ CX models.
3. Secure the dehumidistat hot wire (typically the black lead) to the screw terminal marked "R1" on the furnace circulator blower interface board on GUIV-CA/DX & GUVA-AX models or to the screw terminal marked "R" on the furnace's integrated control module on GUVA-BX/CX models.
4. Secure the dehumidistat ground wire (typically the green lead) to the ground screw on the furnace junction box. **NOTE**: Ground wire may not be present on all dehumidistats.
5. Turn ON power to furnace.

To enable the dehumidify function on the circulator blower interface board:

1. Cut the jumper wire labeled "CUT TO ENABLE" located within the box labeled "DEHUMIDIFY" on the circulator blower interface board on GUIV-CA/DX & GUVA-AX models or adjacent to the DEHUM screw terminal on the furnace's integrated control module on the GUVA-BX/CX models. Refer to the following figures.

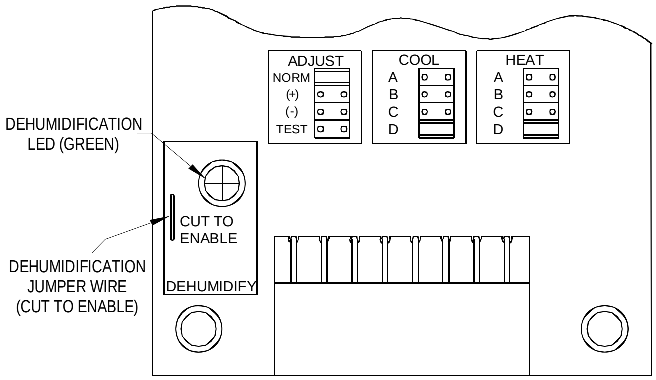
PRODUCT DESIGN

GUIV-FX & GUVA-BX/CX Two-Stage Variable Speed Furnace (Thermostat Wiring Reference Chart)

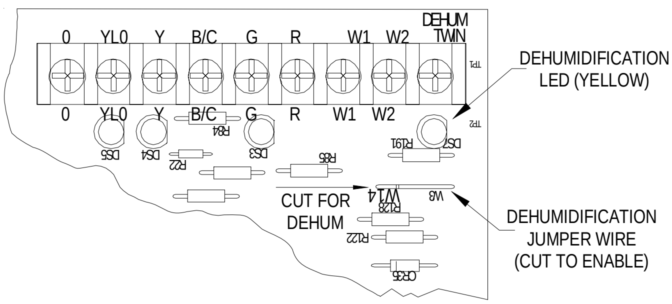
Mode	Thermostat Connection				Connection Options		Furnace Circulator Blower Operation During Call From Thermostat
GENERAL	24 Volts HOT	R	From Room Thermostat	To	R	On Two-Stage Integrated Control Module	N/A
GENERAL	24 Volts COMMON	C	From Room Thermostat	To	C	On Two-Stage Integrated Control Module	N/A
HEATING	***Low Stage*** Connection For "Two-Stage" Heating	W1	From Room Thermostat	To	W1	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* Low Stage *Heating* speed tap.
HEATING	***High Stage*** Connection For "Two-Stage" Heating	W2	From Room Thermostat	To	W2	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Heating* speed tap.
COOLING	Connection For "Single-Stage" Cooling	Y	From Room Thermostat	To	Y	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Cooling* speed tap (5 second "ON" delay and 45 second "OFF" delay)
COOLING	***Low Stage*** Connection For "Two-Stage" Cooling	YLo	From Room Thermostat	To	YLo	On Two-Stage Integrated Control Module	Circulator blower will operate at **65%** of *selected* High Stage *Cooling* speed tap.
COOLING	***High Stage*** Connection For "Two-Stage" Cooling	Y	From Room Thermostat	To	Y	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Cooling* speed tap (5 second "ON" delay and 45 second "OFF" delay)
CONTINUOUS FAN	Continuous Fan Connection	G	From Room Thermostat	To	G	On Two-Stage Integrated Control Module	Circulator blower will operate at **56%** of *selected* High Stage *Cooling* speed tap.

GUIV-CX/DX & GUVA-AX Two-Stage Variable Speed Furnace Thermostat Wiring Reference Chart

Mode	Thermostat Connection				Connection Options		Furnace Circulator Blower Operation During Call From Thermostat	Option Ref.
GENERAL	24 Volts HOT	R	From Room Thermostat	To	R	On Two-Stage Integrated Control Module	N/A	---
	24 Volts COMMON	C	From Room Thermostat	To	C	On Two-Stage Integrated Control Module	N/A	---
HEATING	***Low Stage*** Connection For "Two-Stage" Heating	W1	From Room Thermostat	To	W1	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* Low Stage *Heating* speed tap	W_a
	High Stage Connection For "Two-Stage" Heating	W2	From Room Thermostat	To	W2	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Heating* speed tap	W_b
COOLING	Connection For "Single-Stage" Cooling	Y	From Room Thermostat	To	Y	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Cooling* speed tap (5 second "ON" delay and 45 second "OFF" delay)	Y_a
				To	Y/Y2	On Circulator Blower **Interface** Board (Screw Terminal)	Circulator blower will operate on *selected* High Stage *Cooling* speed tap (No "ON" delay or "OFF" delays)	Y_b
	Low Stage Connection For "Two-Stage" Cooling	Y1	From Room Thermostat	To	Y1	On Circulator Blower **Interface** Board (Screw Terminal)	Circulator blower will operate at **65%** of *selected* High Stage *Cooling* speed tap (No "ON" delay or "OFF" delay)	Y_c
	High Stage Connection For "Two-Stage" Cooling	Y2	From Room Thermostat	To	Y	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Cooling* speed tap (5 second "ON" delay and 45 second "OFF" delay)	Y_d
				To	Y/Y2	On Circulator Blower **Interface** Board (Screw Terminal)	Circulator blower will operate on *selected* High Stage *Cooling* speed tap (No "ON" delay or "OFF" delays)	Y_e
CONTINUOUS FAN	Continuous Fan Connection [Any Application]	G	From Room Thermostat	To	G	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* Low Stage *Heating* speed tap	G_a
				To	G	On Circulator Blower **Interface** Board (Screw Terminal)	Circulator blower will operate at **75%** of *selected* High Stage *Cooling* speed tap **NOTE:** EAC terminals on the two-stage Integrated Control Module will not energize with this method.	G_b
	Contiuous Fan Connection [HEAT W/ **SINGLE** STAGE COOLING ONLY]	G	From Room Thermostat	To	Y1	On Circulator Blower **Interface** Board (Screw Terminal)	Circulator blower will operate at **65%** of *selected* High Stage *Cooling* speed tap **NOTE:** EAC terminals on the two-stage Integrated Control Module will not energize with this method.	G_c
	Continuous Fan Connection [HEAT ONLY/NO COOLING]	G	From Room Thermostat	To	Y1	On Circulator Blower **Interface** Board (Screw Terminal)	Circulator blower will operate at **65%** of *selected* High Stage *Cooling* speed tap **NOTE:** EAC terminals on the two-stage Integrated Control Module will not energize with this method.	G_d
				To	Y	On Two-Stage Integrated Control Module	Circulator blower will operate on *selected* High Stage *Cooling* speed tap	G_e



Air Circulating Motor Interface Board (GUIV-CA/DX & GUVA-AX Models)



50V61 Integrated Ignition Control Module (GUVA-BX/CXModels)

Once the jumper wire is cut, the dehumidify function is enabled during a *combination* call for cooling (T-Stat) and dehumidification (Dehum-Stat). The green LED Located within the box labeled "DEHUMIDIFY" on the circulator blower interface board on GUIV-CA/DX & GUVA-AX models or the yellow LED adjacent to the "DEHUM" screw terminal on GUVA-BX**/CX** models will be illuminated during dehumidification.

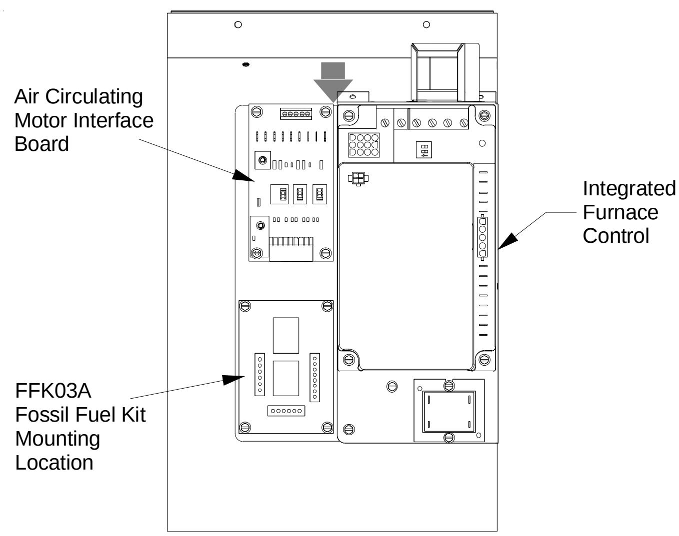
Fossil Fuel Applications

The 80% & 90% Single-Stage and Two-Stage furnaces can be used in conjunction with a heat pump in a fossil fuel application. A fossil fuel application is where an outdoor temperature sensor determines the most cost efficient means of heating (heat pump, gas furnace, or both).

A heat pump thermostat with two stages of heat is required to properly use the single-stage furnace with a heat pump while a heat pump thermostat with three stages of heat is required to properly use the two-stage furnace with a heat pump. Refer to the fossil fuel kit installation manual for additional thermostat requirements.

To install, strictly follow the wiring guidelines in the fossil fuel kit installation. Do **not** connect the "O" and "EM" lines from the heat pump or thermostat directly to the "O" and "EM/W2" terminals on the air circulating motor interface board on GUIV-CA/DX or GUVA-AX models. All connections to the furnace must be to the two-stage integrated furnace control board and must wire to the “FURNACE” terminal strip on the fossil fuel control board.

Space provisions on the control panel have been made to fasten the Amana® brand FFK03A Fossil Fuel Control Board on the GUIV-CA/DX or GUVA-AX Two-Stage Variable Speed Furnace Models only. Refer to the following FFK03A Fossil Fuel Mounting Kit Location figure.



Amana® Brand FFK03A Fossil Fuel Kit Mounting Location (GUIV-CA/DX & GUVA-AX Models Only)

CONTINUOUS FAN OPERATION

80% & 90% Single Stage Furnaces

The single stage furnace control will energize the cooling circulator fan speed when the fan switch on the thermostat is turned to the "ON" position.

80% Two Stage Furnaces

The two stage furnace control will energize the low heat circulator fan speed when the fan switch on the thermostat is turned to the "ON" position. This fan speed will provide circulation with less electricity than conventional single stage equipment.

NOTE: For two stage heat only (no cooling) applications, the continuous fan speed may be increased by jumpering "Y" to "G". Thermostat must have a "G" terminal to make use of this feature.

80% GUIV-CA/DX & 90% GUVA-AX Two-Stage Variable Speed Furnaces

"G" from the thermostat can be connected to: "G" on the furnace two-stage integrated control module, "G" on the circulator blower interface board, “Y1” on the circulator blower interface board (single-stage cooling or no cooling), or "Y" on the furnace tow-stage integrated control module (no cooling). In CONTINUOUS FAN mode, the circulator blower *speed* will differ depending on which connection is used.

1. In any application:

   If "G" from the thermostat is connected to "G" on the furnace *two-stage integrated control module*, then the continuous fan blower speed will be the *same* as the selected *low stage heating* speed tap.

   If "G" from the thermostat is connected to "G" on the *circulator blower interface board*, then the continuous fan blower speed will be *75%* of the selected *high stage cooling* speed tap.

   NOTE: The EAC (Electronic Air Cleaner) terminals on the two-stage integrated control module will not energize using this method. To energize the EAC terminals, the "G" wire from the thermostat must be connected directly to the "G" terminal on the two-stage integrated control module.

2. In two-stage heating/single-stage (or no) cooling applications:

   If "G" from the thermostat is connected to "Y1" on the *circulator blower interface board*, then the continuous fan blower speed will be *65%* of the selected *high-stage cooling* speed tap.

   NOTE: The EAC (Electronic Air Cleaner) terminals on the two-stage integrated control module will not energize using this method. To energize the EAC terminals, the "G" wire from the thermostat must be connected directly to the "G" terminal on the two-stage integrated control module.

3. In two-stage heating only/no cooling applications:

   If "G" from the thermostat is connected to "Y" on the furnace two-stage integrated control module, then the Continuous Fan blower speed will be the *same* as the selected *high stage cooling* speed tap.

Depending on the heating input of the furnace and the capacity of the accompanying cooling system, one continuous fan speed may be preferable to another. The lower the continuous fan speed, the lower the electrical consumption. When using an electronic air cleaner, make sure the continuous fan speed's CFM is within the CFM range listed for the electronic air cleaner. Refer to *Fan Speed Charts* in the furnace Technical Manual or the product *Specification Sheet* for proper blower speed pin selection.

80% GUIV-FX & 90% GUVA-BX/CX Two-Stage Variable Speed Furnaces

1. <u>Continuous Fan Mode</u>:

   If "G" from the thermostat is connected to "G" on the furnace *two-stage integrated control module*, then the continuous fan blower speed will operate at 56% of selected High Stage Cooling speed tap following a five (5) second delay. The EAC (Electronic Air Cleaner) terminals are now energized.

2. ***<u>Low-Stage Heating Mode</u>:***

   If "W1" from the thermostat is connected to "W1" on the Two-Stage Integrated Control Module, the circulator blower will operate on the *selected* Low-Stage <u>*Heating*</u> speed tap following a fixed thirty (30) second on delay. EAC (Electronic Air Cleaner) terminals are energized with the circulator blower.

3. <u>High-Stage Heating Mode</u>:

   If "W2" from the thermostat is connected to "W2" on the Two-Stage Integrated Control Module, the circulator blower will operate on the *selected* High-Stage <u>*Heating*</u> speed tap.

4. <u>Single-Stage Cooling Mode</u>:

   If "Y" from the thermostat is connected to "Y" on the Two-Stage Integrated Control Module, the circulator blower will operate on the *selected* High-Stage <u>*Cooling*</u> speed tap with a (5 second "ON" delay and 45 second "OFF" delay). Circulator blower requires 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.

5. <u>Low-Stage Cooling Mode</u>:

   If "YLo" from the thermostat is connected to "YLo" on the Two-Stage Integrated Control Module, the circulator blower will operate at 65% of *selected* High-Stage Cooling speed tap. Electronic air cleaner terminals are energized with circulator blower.

6. <u>High-Stage Cooling Mode</u>:

   If "Y" from the thermostat is connected to "Y" on the Two-Stage Integrated Control Module, the circulator blower will operate on *selected* High-Stage Cooling speed tap with a (5 second "ON" delay and 45 second "OFF" delay).

CIRCULATOR BLOWER SPEED ADJUSTMENT

WARNING

HIGH VOLTAGE
DISCONNECT ALL POWER BEFOR CHANGING SPEED TAPS. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

All 80% & 90% single-stage and two-stage furnaces ship at high speed for cooling and the speeds listed in the Specification Sheet for heating. These speeds should be adjusted by the installer to match the job requirements. See Specification Sheet or Technical Manual for details.

Connect the correct motor leads to the COOL, LO HEAT, HI HEAT, and PARK terminals. If high heating speed equals cooling speed, use the jumper wire provided. All unused motor leads that are not connected to "PARK" terminals on the control must be taped to prevent shorts.

All 80% & 90% Two-Stage Variable Speed furnaces are shipped with heating speed set at “B” and cooling speed set at “D”. Use the following procedure to select the heating and cooling speed needed for your unit.

PRODUCT DESIGN

To verify airflow quantity use the *"RED"* CFM LED on the circulator blower interface board on GUIV/CA/DX & GUVA-AX models or *"GREEN"* CFM LED adjacent to the integrated control module fuse on GUVA-BX/CX models to verify airflow quantity. The red or green CFM LED blinks once for each 100 CFM of airflow.

1. Determine the tonnage of the cooling system installed with the furnace. If the cooling capacity is in BTU/hr divide it by 12,000 to convert capacity to TONs.

   EXAMPLE: Cooling Capacity of 30,000 BTU/hr.

   30,000/12,000 = 2.5 Tons

2. Determine the proper air flow for the cooling system. Most cooling systems are designed to work with air flows between 350 and 450 CFM per ton. Most manufacturers recommend an air flow of about 400 CFM per ton.

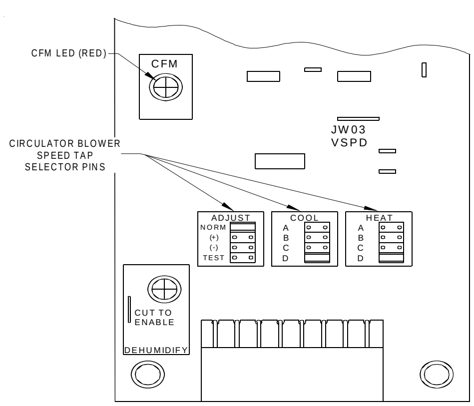
   EXAMPLE: 2.5 tons X 400 CFM per ton = 1000 CFM

   The cooling system manufacturer's instructions must be checked for required air flow. Any electronic air cleaners or other devices may require specific air flows, consult installation instructions of those devices for requirements.

3. Knowing the furnace model, locate the high stage cooling air flow charts in the specification sheet. Look up the cooling air flow determined in step 2 and find the required cooling speed and adjustment setting.

   EXAMPLE: A GUVA070AX40 furnace installed with a 2.5 ton air conditioning system. The air flow needed is 1000 CFM. Looking at the cooling speed chart for GUVA070AX40, find the air flow closest to 1000 CFM. A cooling airflow of 990 CFM may be attained by setting the cooling speed to "C" and the adjustment to "-" (minus).

4. Locate the circulator blower interface board on the control panel in the blower compartment. On the circulator blower interface board, find the "COOL" speed tap selector pin and move it to the proper speed. Next find the "ADJUST" tap selector pin and move it to the proper adjust level. Verify CFM by counting blinks of the "RED" CFM LED. Refer to the following figure.



Circulator Blower Speed Tap Selector Pin Location (GUIV-CA/DX & GUVA-AX Models)

   EXAMPLE: On the example used, move the "COOL" speed tap selector pin to "C" and move the "ADJUST" tap selector to "-" (minus).

   Do **NOT** move the Adjust pin to "TEST".

5. Select the heating speed from the heating speed chart in the specification sheet for your model. The adjust setting (already established by the cooling speed selection) will determine which set of speeds are available. The selected speed must provide a temperature rise within the rise range listed with the particular model.

   EXAMPLE: The GUVA070AX40 is set for 990 CFM on cooling, the "ADJUST" is set to "-" (minus). The four heating speeds available are "A Minus", "B Minus", "C Minus", and "D Minus". "A Minus" has a rise of 56°F for both stages which is within the 30-60°F rise range for the GUVA070AX40. This setting will keep electrical consumption to a minimum. Move the "Heat" speed pin selector to "A".

In general lower heating speeds will: reduce electrical consumption, lower operating sound levels of the blower, and increase the outlet air temperature delivered to the home. The speeds available allow the blower performance to be optimized for the particular homeowner's needs.

6. The continuous fan speed may be selected from one of three speeds. Knowing the heating speed selection, look up the heating-based continuous fan air flow (see Specification Sheet). Knowing the cooling speed selection, look up the cooling-based continuous fan air flows options A & B (see Specification Sheet). **NOTE:** Option B is NOT applicable if a two-stage cooling system is used. Knowing the three possible continuous fan speeds, select the speed that best fits the application. The lower CFM will use less electricity and minimize operating sound levels.

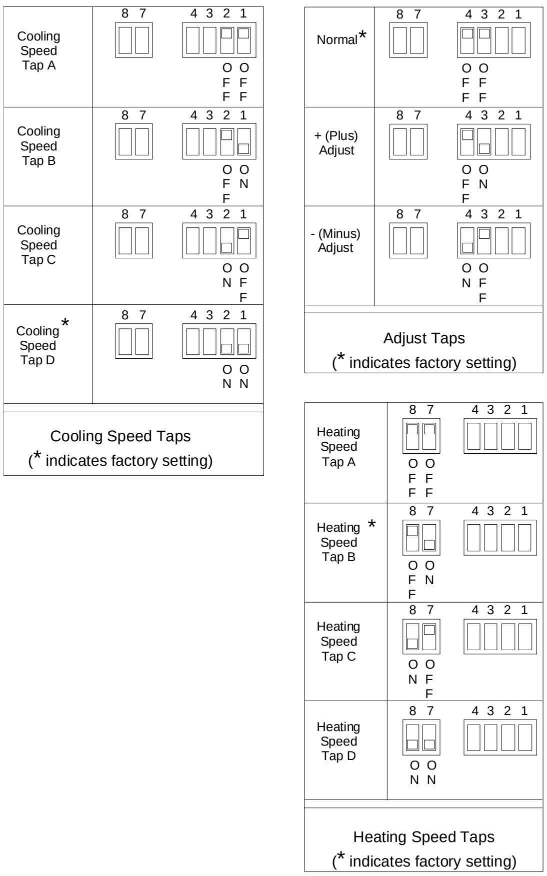
   EXAMPLE: With the GUVA070AX40 set to "A Minus" on heating, the heating-based continuous fan speed will be 756 CFM (refer to specification sheet or technical manual for airflows). The cooling speed was set to "C Minus" so the cooling-based continuous fan speeds are 743 CFM (Option A) or 644 CFM (Option B). Because, the cooling-based continuous fan speed is lower, it should be selected.

7. Knowing the continuous fan speed desired, the unit should be wired to accommodate this speed. If the continuous fan speed desired is based on the heating speed, connect "G" from the thermostat to "G" on the two-stage integrated control module. If the continuous fan speed desired is based on the cooling speed option A, connect "G" from the thermostat to "G" on the air circulating blower interface board. If the continuous fan speed desired is based on the cooling speed Option B, connect "G" from the thermostat to "Y1" on the circulator board interface board.

PRODUCT DESIGN

NOTE: The EAC (Electronic Air Cleaner) terminals on the two-stage integrated control module on the GUIV-CA/DX & GUVA-AX models will not energize using this method. To energize the EAC terminals, the "G" wire from the thermostat must be connected directly to the "G" terminal on the two-stage integrated control module.

NOTE: The GUVA-BX/CX and GUIV-FX models do not use a separate circulator blower interface board. The circulator blower speeds are adjusted by speed selection DIP switches located on the integrated ignition control module. Refer to the following figure.



Circulator Blower Speed Tap DIP Switches
(GUVA-BX/CX Models & GUIV-FX Models)

CIRCULATOR BLOWER TIMINGS

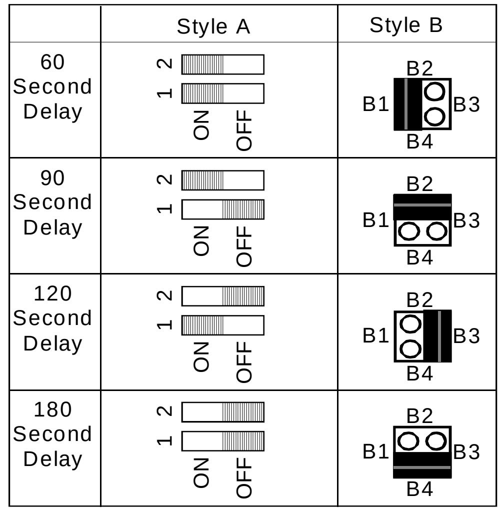
Single Stage 80% & 90% Furnaces and 80% Two Stage Furnaces

All items in this section refer to the air circulation blower, not to the induced draft blower. The timing sequence for the induced draft blower is not adjustable.

When a call for cooling occurs, the circulation fan will come on. It will remain on for 45 seconds after the call for cooling ends. This fan timing is not adjustable.

Blower Heat Off Delay Timing

The integrated control module provides a selectable heat off delay function. The heat off delay period may be set to 60, 90, 120, or 180 seconds using the DIP switches or jumper provided on the control module. The delay is factory shipped at 90 seconds but may be changed to suit the installation requirements and/or homeowner preference. Refer to the following figures for switch positions and corresponding delay times.



Heat Off Delay Adjustments

80% & 90% Two-Stage Variable Speed Furnaces

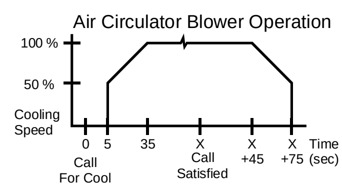
All items in this section refer to the air circulation blower not to the induced draft blower. The timing sequence for the induced draft blower is not adjustable.

Cooling Fan Timing

The cooling system may be attached in one of two ways. The following will explain the two possible operations:

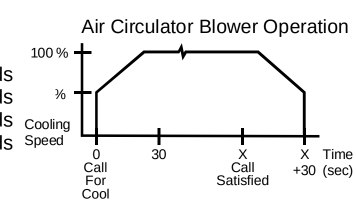
If "Y" from the thermostat is connected to "Y" on the Two-stage Integrated Furnace Control, then the following on and off sequences will occur.

Cooling On Delay:	5 seconds
Cooling On Ramp Up:	30 seconds
Cooling Off Delay:	45 seconds
Cooling Off Ramp Down:	30 seconds



If "Y" from the thermostat is connected to "Y/Y2" on the air circulation motor interface board, then the following on and off sequences will occur.

Cooling On Delay:	0 seconds
Cooling On Ramp Up:	30 seconds
Cooling Off Delay:	0 seconds
Cooling Off Ramp Down:	30 seconds



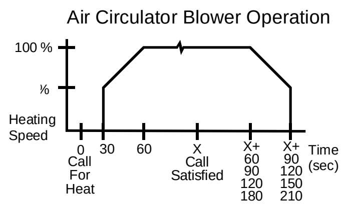
NOTE: This option of no cooling "ON" or "OFF" air circulator blower delay is only available on GUIV-CA/DX & GUVA-AX models.

PRODUCT DESIGN

Heating Fan Timing

The heating fan timing has a fixed on sequence with an adjustable delay off timing. The delay timing may be adjusted using the switches near the low voltage terminal strip (see the previous switch position figure). For heating operation "W1" from the thermostat **must** be connected to "W1" on the two-stage integrated furnace control. "W2" from the thermostat **must** be connected to "W2" on the two-stage integrated furnace control. The thermostat connections have no bearing on the operational sequence *timings* of the circulator blower during heating. The following on and off sequences of the air circulating blower fan will occur:

Heating On Delay: 30 seconds
Heating On Ramp Up: 30 seconds
Heating Off Delay: 60, 90, 120, or 180 seconds (Adjustable)
Heating Off Ramp Down: 30 seconds



CIRCULATING AIR AND FILTERS

DUCTWORK - AIR FLOW

Duct systems and register sizes must be properly designed for the C.F.M. and external static pressure rating of the furnace. Ductwork should be designed in accordance with the recommended methods of "Air Conditioning Contractors of America" manual D.

A duct system should be installed in accordance with Standards of the National Board of Fire Underwriters for the Installation of Air Conditioning, Warm Air Heating and Ventilating Systems, Pamphlets No. 90A and 90B.

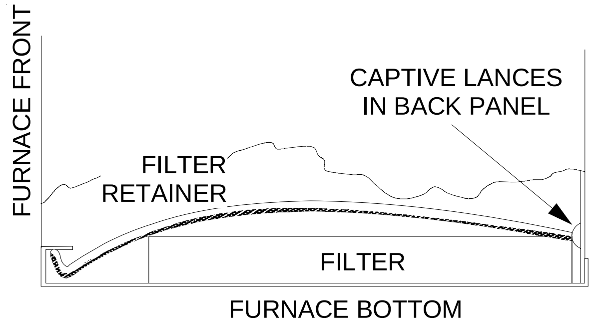
A return air filter is not supplied with the furnace. The installer must supply a means of filtering all of the return air. Filter(s) shall comply with UL900 or CAN/ULC-S111 Standards. If the furnace is installed without filters, the warranty will be voided.

The following two charts show the bottom and side return filter sizes available for each size furnace. Larger sizes are also acceptable.

BOTTOM RETURN AIR FILTER SIZES		
Cabinet Width	Filter Size (Inches)	Filter Area (in2)
16 1/2	14 X 25 X 1	350
20 1/2	16 X 25 X 1	400
24 1/2	20 X 25 X 1	500

SIDE RETURN AIR FILTER SIZE		
Cabinet Width	Filter Size (Inches)	Filter Area (in^2)
All Widths	16 x 25 x 1	400

The following sketch below shows how the filter is retained over the bottom return air opening.



Bottom Return Filter Retention

One inch throwaway filters should be sized for a face velocity of 300 feet per minute or less (14x25x1 throwaway = 730 CFM maximum, 16x25x1 throwaway = 830 CFM maximum, 18x25x1 throwaway = 940 CFM maximum, 20x25x1 throwaway = 1040 CFM maximum) All other filters should be sized according to their manufacturer's instructions.

To find the minimum filter requirement (in^2) for either permanent or disposable filters multiply the required airflow (CFM) by $144ft^2$ and then divide this number by rated velocity of the filter, either 300ft/min for disposable filter or 600ft/min for permanent filter.

EXAMPLE:

$$\text{Filter Size } (in^2) = \frac{\text{Required Airflow (CFM)} \times 144ft^2}{300 \text{ (Disposable) or } 600 \text{ (Permanent)}}$$

$$\text{Filter Size } (in^2) = \frac{1400 \text{ CFM} \times 144ft^2}{300 \text{ (Disposable) or } 600 \text{ (Permanent)}}$$

Filter Size = $672in^2$ Disposable

Filter Size = $336in^2$ Permanent

For air delivery of less than 1800 CFM:

Use one side return or one bottom return ductwork connection.

For air delivery of 1800 CFM or higher:

Use two side returns or one side return and one bottom return connection.

Guide dimples locate the side and bottom return cutout locations. Use a straight edge to scribe lines connecting the dimples. Cut out the opening on these lines. An undersized opening will cause reduced airflow. For bottom return connection, remove the bottom of the cabinet before setting the furnace on the raised platform or return air duct.

PRODUCT DESIGN

A closed return duct system must be used, with the return duct connected to the furnace. ***NOTE:** Ductwork must never be attached to the back of the furnace.* Supply and return connections to the furnace may be made with flexible joints to reduce noise transmission, if desired. If a central return is used, a connecting duct must be installed between the unit and the utility room wall so the blower will not interfere with combustion air or draft. The room, closet, or alcove must not be used as a return air chamber.

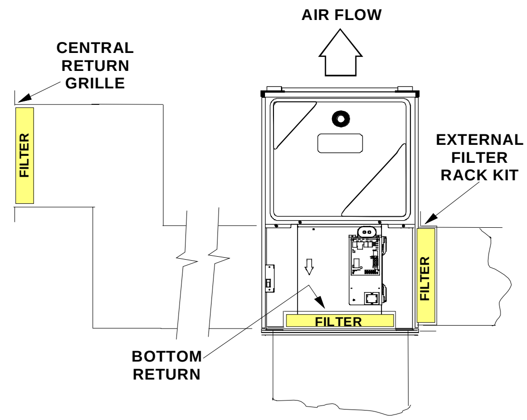
When the furnace is used in connection with a cooling unit, the furnace should be installed in parallel with or on the upstream side of the cooling unit to avoid condensation in the heating element. With a parallel flow arrangement, the dampers or other means used to control the flow of air must be adequate to prevent chilled air from entering the furnace and, if manually operated, must be equipped with means to prevent operation of either unit unless the damper is in the full heat or cool position.

When the furnace is heating, the temperature of the return air entering the furnace must be between **55°F** and **100°F**.

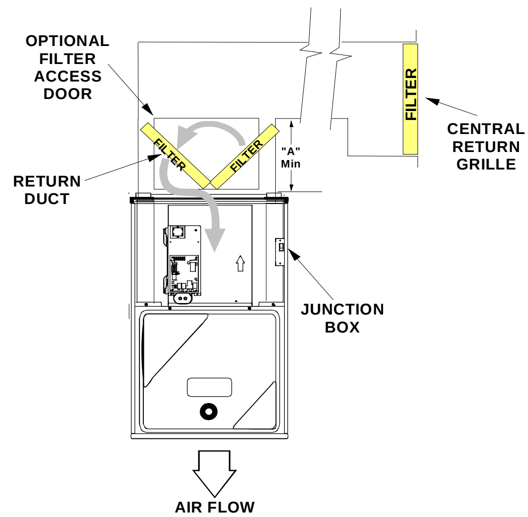
Upright Installations

Depending on the installation and/or customer preference, differing filter arrangements can be applied. Filters can be installed in the central return register, the bottom of the blower compartment (upflows), a side panel external filter rack kit (upflows), or inside the side panel (upflows), or the ductwork above a counterflow furnace. As an alternative a media air filter or electronic air cleaner can be used as the requested filter. Refer to the following minimum filter requirement charts for determination of the minimum filter area to ensure proper unit performance. The following figures show possible filter locations. **NOTE:** A ductwork access door must be used in counterflow applications to allow filter removal. If the filter rack is used, the side of the plenum must be at least as tall as dimension "A" shown in the following illustration. For dimension of "A" refer to the following chart.

COUNTERFLOW TOP RETURN AIR FILTER SIZES				
Cabinet Width	QTY	Filter Size (Inches)	Filter Area (in2)	Dimension "A"
16 1/2	2	15 X 20 X 1	600	14.2
20 1/2	2	15 X 20 X 1	600	13
24 1/2	2	15 X 20 X 1	600	11.3
16 1/2	2	20 X 20 X 1	800	19.7
20 1/2	2	20 X 20 X 1	800	18.8
24 1/2	2	20 X 20 X 1	800	17.7
16 1/2	2	25 X 20 X 1	1000	25.0
20 1/2	2	25 X 20 X 1	1000	24.3
24 1/2	2	25 X 20 X 1	1000	23.4



POSSIBLE *UPRIGHT* UPFLOW FILTER LOCATIONS



POSSIBLE *UPRIGHT* COUNTERFLOW FILTER LOCATIONS

(90% Furnace Shown, 80% Similar)

Horizontal Installations

Filter(s) must be installed external to the furnace casing for horizontal installations. For most installations it is preferable to use a central return with filters installed in the duct behind the return air grill. In this way filter replacement is relatively simple by merely removing the grille, rather than going into the attic or crawl space.

Refer to the previous *Upflow/Horizontal Filter Size* charts on Recommended Minimum Filter Sizes.

ADDITIONAL FILTERING ACCESSORIES

External Filter Rack Kit (EFR01)

The external filter rack kit is intended to provide a location external to the furnace casing, for installation of a permanent filter on upflow model furnaces. The rack is designed to mount over the indoor blower compartment area of either side panel, and provide filter retention as well as a location for attaching return air ductwork.

PRODUCT DESIGN

Model	Minimum Filter Requirement (in^2) Permanent Filters						
	Airflow Requirements (Nominal)						
	600 CFM	800 CFM	1000 CFM	1200 CFM	1400 CFM	1600 CFM	2000 CFM
G(C/U)CA045--30	188 *	192	240	288	----	----	----
G(C/U)CA070--30	----	282 *	282 *	282 *	336	----	----
G(C/U)CA070--40	----	----	260 *	260 *	336	384	----
G(C/U)CA090--40	----	----	376 *	376 *	376 *	384	----
G(C/U)CA090--50	----	----	----	376 *	376 *	384	480
G(C/U)CA115--50	----	----	----	470 *	470 *	470 *	480
GUVA045--30	209 *	209 *	240	288	----	----	----
GUVA070--40	----	----	313 *	313 *	336	384	----
GUVA090--50	----	----	----	418 *	418 *	418 *	480
GUVA115--50	----	----	----	470 *	470 *	470 *	480
GUSA070--35	----	282 *	282 *	282 *	336	----	----
GUSA090--40	----	----	376 *	376 *	376 *	384	----
GUSA090--50	----	----	----	376 *	376 *	384	480
GUSA115--50	----	----	----	470 *	470 *	470 *	480
GUI(A/B/C/D)045--30	168 *	192	240	288	----	----	----
GUI(A/B/C/D)070--30	251 *	251 *	251 *	288	----	----	----
GUI(A/B/C/D)070--40	----	----	251 *	288	336	384	----
GUI(A/B/C/D)090--30	305 *	305 *	305 *	305 *	----	----	----
GUI(A/B/C/D)090--50	----	----	----	305 *	336	384	480
GUI(A/B/C/D)115--40	----	----	381 *	381 *	381 *	384	----
GUI(A/B/C/D)115--50	----	----	----	381 *	381 *	384	480
GUI(A/B/C/D)140--50	----	----	----	419 *	419 *	419 *	480
GUIS070--35	----	----	251 *	288	336	----	----
GUIS090--30	305 *	305 *	305 *	305 *	----	----	----
GUIS090--50	----	----	----	305 *	336	384	480
GUIS115--40	----	----	381 *	381 *	381 *	384	----
GUIS115--50	----	----	----	381 *	381 *	384	480
GUIS140--50	----	----	----	419 *	419 *	419 *	480
GUIV070--40	279*	279*	279 *	288	336	384	----
GUIV090--50	----	----	335*	335*	336	384	480
GUIV115--50	----	----	419*	419 *	419 *	419 *	480
GUIV140--50	----	----	419*	419 *	419 *	419 *	480
GCI(A/B/C)045--30	168 *	192	240	288	----	----	----
GCI(A/B/C/D)070--30	210 *	210 *	240	288	----	----	----
GCI(A/B/C)070--40	----	----	240	288	336	384	----
GCI(A/B/C)090--30	279 *	279 *	279 *	288	----	----	----
GCI(A/B/C/D)090--50	----	----	----	288	336	384	480
GCI(A/B/C/D)115--40	----	----	349 *	349 *	349 *	384	----
GCI(A/B/C)115--50	----	----	----	349 *	349 *	384	480
GCI(A/B/C)140--50	----	----	----	419 *	419 *	419 *	480
GCIS070--35	----	251 *	251 *	288	336	----	----
GCIS090--50	----	----	----	288	336	384	480

* Mimimum Filter Area Based on Heating Airflow Requirement

NOTE: The dashed (----) areas indicate not used in this application.

PRODUCT DESIGN

Model	Minimum Filter Requirement (in²) Permanent Filters						
	Airflow Requirements (Nominal)						
	600 CFM	800 CFM	1000 CFM	1200 CFM	1400 CFM	1600 CFM	2000 CFM
GCLA070CX30	--	288*	282*	282*	336	--	--
GCLA090CX40	--	--	376*	376*	376*	384*	--
GCLA115CX50	--	--	--	470*	470*	470*	480
GCVA070CX40	--	--	320*	320*	336	384	--
GCVA090CX50	--	--	--	427*	427*	427*	480
GULA045AX/CX30	188*	192	240	288	--	--	--
GULA070AX/CX30	--	282*	282*	282*	336	--	--
GULA070AX/CX40	--	--	260*	260*	336	384	--
GULA090AX/CX40	--	--	376*	376*	376*	384	--
GULA090AX/CX50	--	--	--	376*	376*	384	480
GULA115AX/CX50	--	--	--	470*	470*	470*	480
GUIE045EX30	168*	192	240	288	--	--	--
GUIE070EX40	--	--	251*	288	336	384	--
GUIE090EX40	--	--	--	305*	336	384	480
GUIE090EX50	--	--	--	305*	336	384	480
GUIE115EX50	--	--	--	381*	381*	384	480

* Mimimum Filter Area Based on Heating Airflow Requirement

NOTE: The dashed (----) areas indicate not used in this application.

PRODUCT DESIGN

Model	Minimum Filter Requirement (in²) Disposable Filters						
	Airflow Requirements (Nominal)						
	600 CFM	800 CFM	1000 CFM	1200 CFM	1400 CFM	1600 CFM	2000 CFM
G(C/U)CA045--30	376 *	384	480	576	----	----	----
G(C/U)CA070--30	----	564 *	564 *	564 *	672	----	----
G(C/U)CA070--40	----	----	564 *	564 *	672	768	----
G(C/U)CA090--40	----	----	752 *	752 *	752 *	768	----
G(C/U)CA090--50	----	----	----	752 *	752 *	768	960
G(C/U)CA115--50	----	----	----	940 *	940 *	940 *	960
GUVA045--30	----	564 *	564 *	564 *	762	----	----
GUVA070--40	----	----	752 *	752 *	752 *	768	----
GUVA090--50	----	----	----	752 *	752 *	768	960
GUVA115--50	----	----	----	940 *	940 *	940 *	960
GUSA070--35	376 *	384	480	576	----	----	----
GUSA090--40	----	----	627 *	627 *	672	768	----
GUSA090--50	----	----	----	836 *	836 *	836 *	960
GUSA115--50	----	----	----	940 *	940 *	940 *	960
GUI(A/B/C/D)045--30	335 *	384	480	576	----	----	----
GUI(A/B/C/D)070--30	503 *	503 *	503 *	576	----	----	----
GUI(A/B/C/D)070--40	----	----	503 *	576	672	768	----
GUI(A/B/C/D)090--30	610 *	610 *	610 *	610 *	----	----	----
GUI(A/B/C/D)090--50	----	----	----	610 *	672	768	960
GUI(A/B/C/D)115--40	----	----	762 *	762 *	762 *	768	----
GUI(A/B/C/D)115--50	----	----	----	762 *	762 *	768	960
GUI(A/B/C/D)140--50	----	----	----	838 *	838 *	838 *	960
GUIS070--35	----	----	503 *	576	672	----	----
GUIS090--30	610 *	610 *	610 *	610 *	----	----	----
GUIS090--50	----	----	----	610 *	672	768	960
GUIS115--40	----	----	762 *	762 *	762 *	768	----
GUIS115--50	----	----	----	762 *	762 *	768	960
GUIS140--50	----	----	----	838 *	838 *	838 *	960
GUIV070--40	559*	559*	559 *	576	672	768	----
GUIV090--50	----	----	671*	671 *	672	768	960
GUIV115--50	----	----	----	838 *	838 *	838 *	960
GUIV140--50	----	----	----	838 *	838 *	838 *	960
GCI(A/B/C)045--30	335 *	384	480	576	----	----	----
GCI(A/B/C/D)070--30	419 *	419 *	480	576	----	----	----
GCI(A/B/C)070--40	----	----	480	576	672	768	----
GCI(A/B/C)090--30	559 *	559 *	559 *	576	----	----	----
GCI(A/B/C/D)090--50	----	----	----	576	672	768	960
GCI(A/B/C/D)115--40	----	----	699 *	699 *	699 *	768	----
GCI(A/B/C)115--50	----	----	----	699 *	699 *	768	960
GCI(A/B/C)140--50	----	----	----	838 *	838 *	838 *	960
GCIS070--35	----	503 *	503 *	576	672	----	----
GCIS090--50	----	----	----	576	672	768	960

* Mimimum Filter Area Based on Heating Airflow Requirement

NOTE: The dashed (----) areas indicate not used in this application.

PRODUCT DESIGN

Model	Minimum Filter Requirement (in²) Disposable Filters — Airflow Requirements (Nominal)						
	600 CFM	800 CFM	1000 CFM	1200 CFM	1400 CFM	1600 CFM	2000 CFM
GCLA070CX30	--	564*	564*	564*	672	--	--
GCLA090CX40	--	--	752*	752*	752*	768	--
GCLA115CX50	--	--	--	9408	940*	940*	800
GCVA070CX40	--	--	641*	641*	672	768	--
GCVA090CX50	--	--	--	854	854	854	960
GULA045CX30	376	384	480	576	--	--	--
GULA070CX30	--	564*	564*	564*	672	--	--
GULA070CX40	--	--	564*	564*	672	768	--
GULA090CX40	--	--	752*	752*	752*	768	--
GULA090CX50	--	--	--	752*	752*	768	800
GULA115CX50	--	--	--	940	940*	940*	800
GUIE045EX30	335*	384	480	576	--	--	--
GUIE070EX40	--	--	503*	576	672	768	--
GUIE090EX40	610*	610*	--	610*	672	768	960
GUIE090EX50	--	--	--	610*	672	768	960
GUIE115EX50	--	--	--	762*	762*	768	960

* Mimimum Filter Area Based on Heating Airflow Requirement

NOTE: The dashed (----) areas indicate not used in this application.

Electronic Air Cleaner (EAC5) or Media Air Cleaner (MAC1)

The electronic air cleaner and media air cleaner are multi-positional high efficiency air filtration devices that can be installed in any position, except with the access door facing down. The best location for the air cleaner is in the return air duct next to the blower compartment. Before installing the air cleaner, consider the application. The electronic air cleaner must be readily accessible for periodic inspection and cleaning of the pre-filters and electronic cells while the media air cleaner must be readily accessible for periodic inspection and replacement of the media cartridge (MAF), to maintain maximum efficiency and trouble-free operation.

Accomodator Filter Housing (ACG1625-3/6, ACG2025-3/6 and ACG2424-3/6)

The Accomodator is a filter cabinet that provides a location external to the furnace casing for installation of a filter on upflow model furnaces using bottom return. The Accomodater gives the homeowner the option of using many choices of filter types and sizes. The filter sizes that may be used are 1", 2" and 4".

Horizontal Filter Housing (HR20 & HR25)

The Horizontal Filter Housing provides a location external to the furnace casing for installation of a filter(s) on upflow model furnaces using side air return(s). The Horizontal Filter Housing gives the homeowner the option of using many choices of filter types and sizes. The filter sizes that may be used are 1", 2" or 4".

NOTE: For complete details on each of the additional filtering accessories, refer to the instructions provided with each accessory.

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(80% or 90% Models with White-Rodgers 50A50 or Heatcraft HSI 1-1A Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized causing pressure switch contacts to close. Humidifier terminals are energized with induced draft blower.
4. Ignitor warm up begins upon close of pressure switch contacts.
5. Gas valve opens at end of ignitor warm up period, delivering gas to burners and establishing flame.
6. Integrated control module monitors flame presence. Gas valve will remain open only if flame is sensed.
7. Circulator blower is energized on heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat.
10. Gas valve closes, extinguishing flame.
11. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
12. Circulator blower is de-energized following a selectable heat off delay period (60, 90, 120, or 180 seconds). Electronic air cleaner terminals are de-energized.
13. Furnace awaits next call from thermostat.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period. Electronic air cleaner terminals are de-energized.
9. Furnace awaits next call from thermostat.

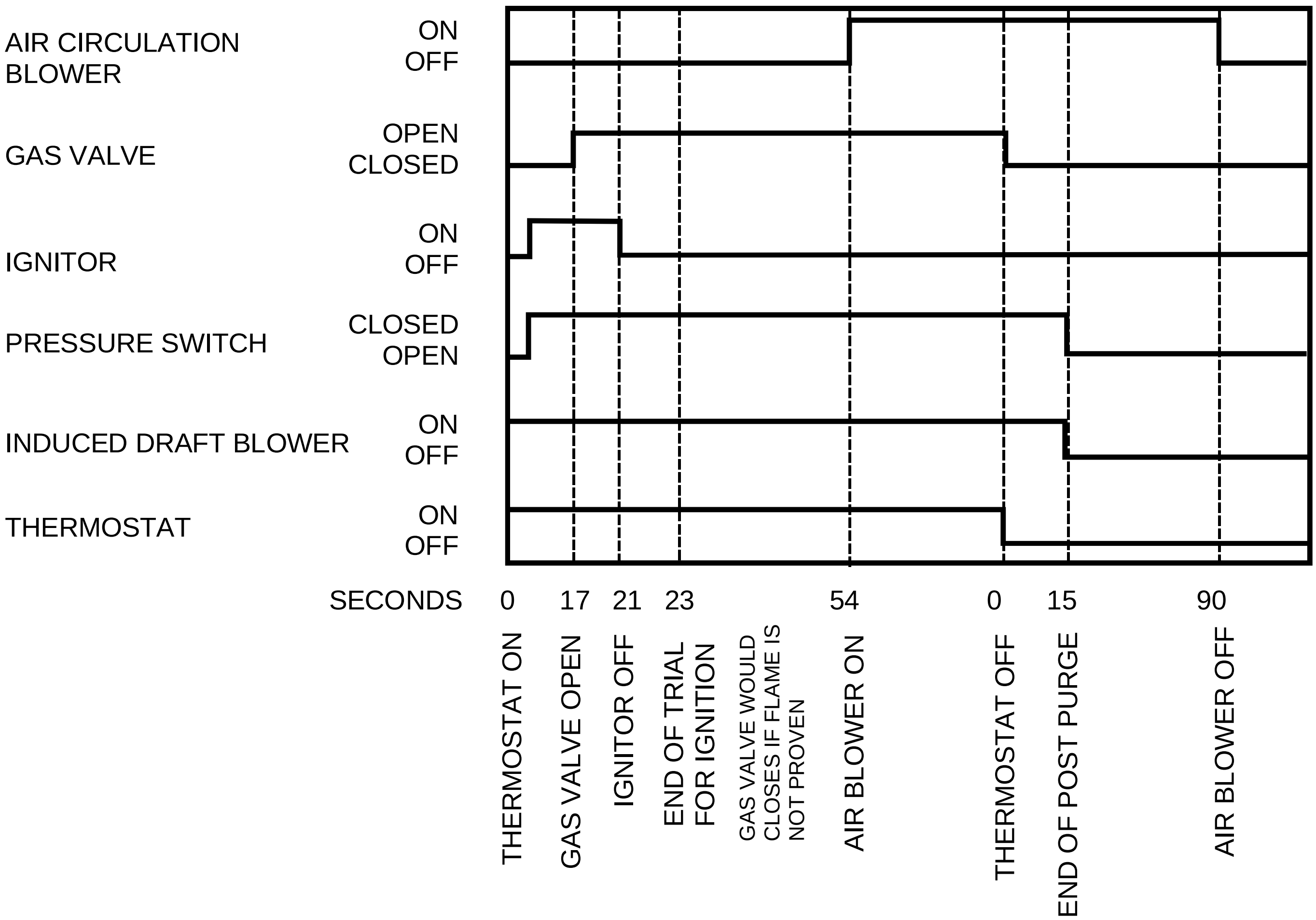
Fan Only Mode

The normal operational sequence in fan only mode is as follows:

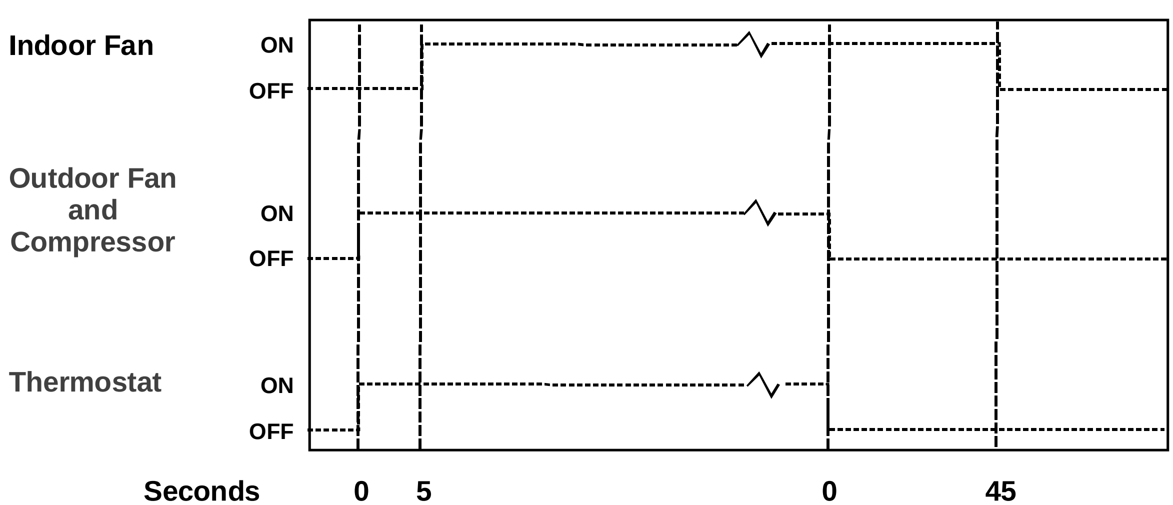
1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on cool speed. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

SYSTEM OPERATION

HEATING TIMING CHART FOR WHITE-RODGERS 50A50 AND HEATCRAFT HSI 1-1A INTEGRATED IGNITION CONTROL OPERATION



COOLING TIMING CHART FOR WHITE-RODGERS 50A50 AND HEATCRAFT HSI 1-1A INTEGRATED IGNITION CONTROL OPERATION



SYSTEM OPERATION

ABNORMAL OPERATION

(80% or 90% Models with White-Rodgers 50A50 or Heatcraft HSI 1-1A Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *Diagnostic Signal Chart* below for an interpretation of the LED signals and to the information in this section for a description of the problem.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes.** The control should be replaced.
2. **System Lockout.** If a flame is not sensed during the first seven (7) seconds after the gas valve is energized, the control turns off the gas. There will then be a 60 second delay while the induced draft blower is energized to purge the heat exchanger. The ignitor will next be energized and preheated for 27 seconds. The gas valve will then be energized. If flame is not sensed in seven (7) seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three (3) times before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after ten (10) seconds, the control will recycle this series of three tries four (4) more times before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

NOTE: The control board will automatically reset one hour after lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected.

3. **Pressure Switch Stuck Closed.** If the control senses the pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or wiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the pressure switch does not close, the control will keep the blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable cause is either disconnected hose to the pressure switch, faulty pressure switch or wiring, or restricted air intake or flue piping.
5. **Open Limit Control.** If the limit control opens, the air circulator and induced draft blower will be turned on until the limit closes. The diagnostic light code for this problem is **four short flashes** followed by a pause. The probable cause is either low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, or blower speed set to low.
6. **Open Rollout Control.** If the rollout control opens, the air circulator blower and induced draft blower will be energized all the time. The diagnostic light code for this problem is **five flashes** followed by a pause. The probable cause is either restricted flue piping or improper air requirements.
7. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized, it will run the air circulator blower and the induced draft blower continuously. The diagnostic light code for this problem is **continuous light flashing**. The probable causes are either a short to ground in flame sense circuit, miswiring, lingering burner flame or a slow closing gas valve.

50A50 or HSI 1-1A INTEGRATED IGNITION CONTROL DIAGNOSTIC SIGNAL CHART	
LIGHT SIGNAL	**FOR CORRECTIVE ACTION REFER TO ABNORMAL OPERATION NUMBER**
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Open Limit Control
5 Flashes	6. Open Rollout Control
Continuous Flashing	7. Flame Sensed No Call For Heat

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(80% or 90% Models with White-Rodgers 50A55 / 50T55 or Heatcraft HSI-2 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized causing pressure switch contacts to close. Humidifier terminals are energized with induced draft blower.
4. Ignitor warm up begins upon close of pressure switch contacts. **Note:** Heatcraft HSI-2 ignition control has a fixed standard s*even-second* ignitor warm-up period and the White-Rodgers 50A55 / 50T55 ignition control has a variable standard ignitor warm up period between a *17-second maximum* and a *five-second minimum*.
5. Gas valve opens at end of ignitor warm up period, delivering gas to burners and establishing flame.
6. Integrated control module monitors flame presence. Gas valve will remain open only if flame is sensed.
7. Circulator blower is energized on heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat.
10. Gas valve closes, extinguishing flame.
11. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
12. Circulator blower is de-energized following a selectable heat off delay period (60, 90, 120, or 180 seconds). Electronic air cleaner terminals are de-energized.

    Note: The 50T55 Ignition Control, used on GCLA*AX/CX, GULA*AX/CX,GUIE*EX models, has a fixed 90 second circulator blower heat off delay.
13. Furnace awaits next call from thermostat.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period. Electronic air cleaner terminals are de-energized.
9. Furnace awaits next call from thermostat.

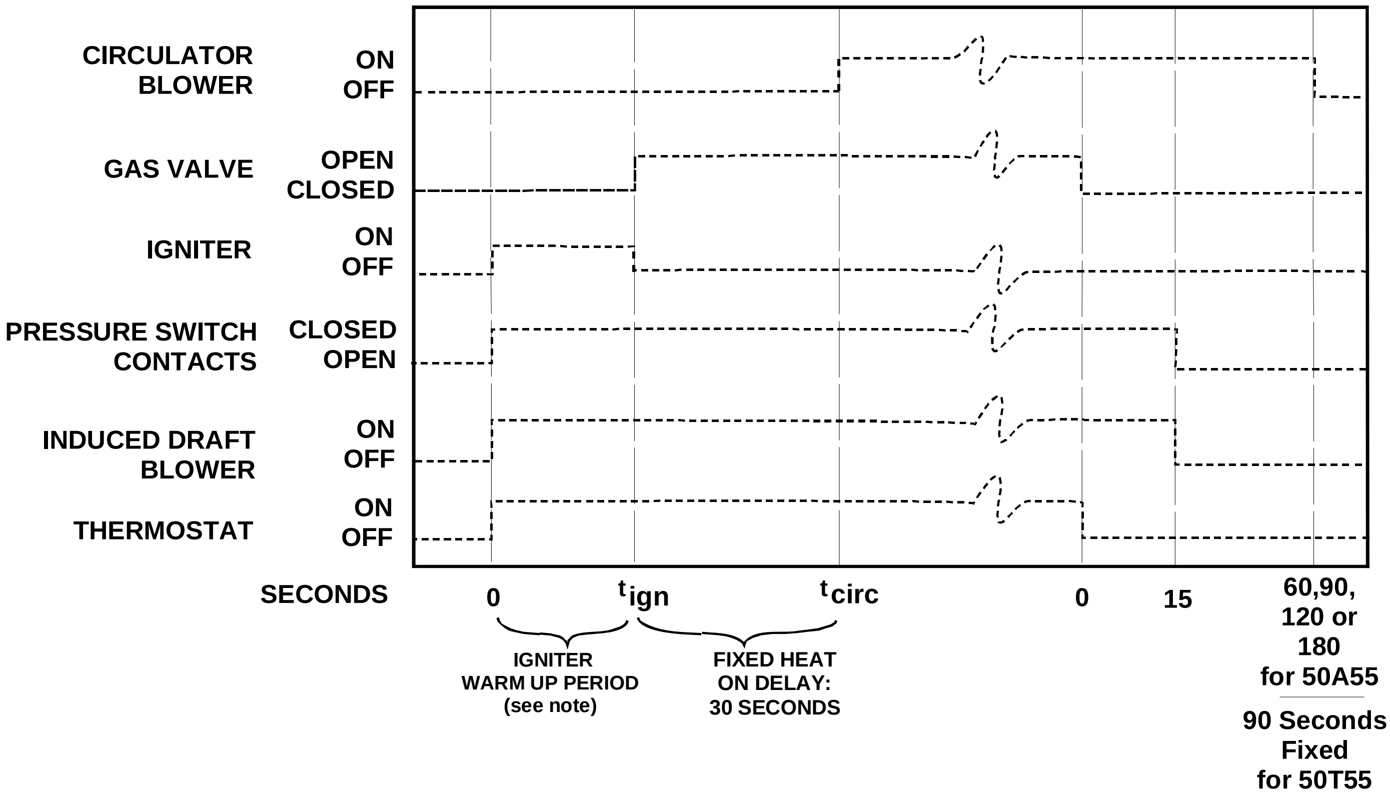
Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on cool speed. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

SYSTEM OPERATION

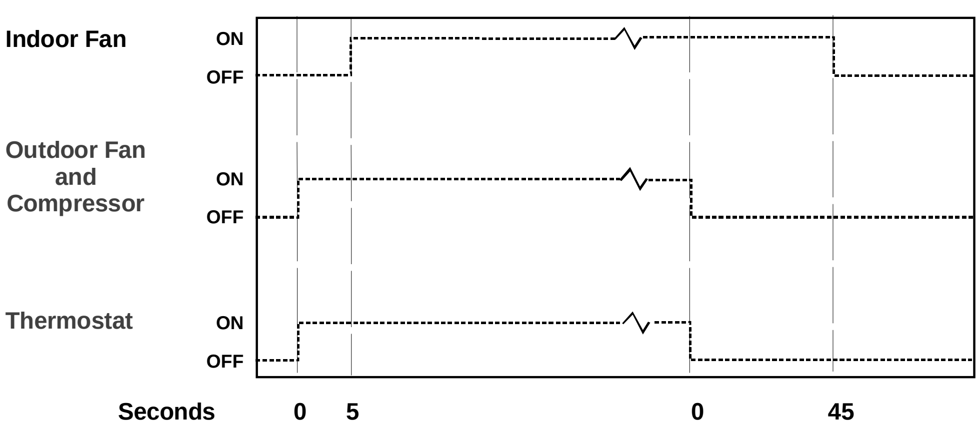
HEATING TIMING CHART FOR WHITE-RODGERS 50A55/50T55 AND HEATCRAFT HSI-2 INTEGRATED IGNITION CONTROL OPERATION



NOTE: <u>HEATCRAFT</u> INTEGRATED CONTROL MODULE HAS A FIXED STANDARD SEVEN-SECOND IGNITER WARM UP PERIOD (MINI IGNITER).

<u>WHITE-RODGERS</u> INTEGRATED CONTROL MODULE HAS A VARIABLE STANDARD IGNITER WARM UP PERIOD BETWEEN A 17-SECOND MAXIMUM AND A FIVE-SECOND MINIMUM.

COOLING TIMING CHART FOR WHITE-RODGERS 50A55/50T55 AND HEATCRAFT HSI-2 INTEGRATED IGNITION CONTROL OPERATION



SYSTEM OPERATION

ABNORMAL OPERATION

(80% or 90% Models with White-Rodgers 50A55/50T55 or Heatcraft HSI-2 Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *Troubleshooting Chart* on the following pages for an interpretation of the LED signals and to the information in this section for a description of the problem.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes.** The control should be replaced.
2. **System Lockout.** If a flame is not sensed during the first seven (7) seconds after the gas valve is energized, the control turns off the gas. There will then be a 60 second delay while the induced draft blower is energized to purge the heat exchanger. The ignitor will next be energized and preheated for 27 seconds. The gas valve will then be energized. If flame is not sensed in seven (7) seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three (3) times before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after ten (10) seconds, the control will recycle this series of three tries four (4) more times before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

NOTE: The control board will automatically reset one hour after lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected. Refer to *Troubleshooting Chart* on the following pages for aid in determining the cause.

3. **Pressure Switch Stuck Closed.** If the control senses the pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or wiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the pressure switch does not close, the control will keep the induced draft blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable causes are either disconnected hose to the pressure switch, faulty pressure switch or wiring, or restricted air intake or flue piping.
5. **Open Primary or Auxiliary Limit.** If the limit control opens, the air circulator blower and induced draft blower will be turned on until the limit closes. The diagnostic light code for this problem is **four short flashes** followed by a pause. The probable cause is either low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, or blower speed set to low.
6. **Open Rollout Limit.** If the rollout control opens, the air circulator blower will be energized all the time. The diagnostic light code for this problem is **five flashes** followed by a pause. The probable cause is either restricted flue piping or improper air requirements.
7. **Reversed Polarity.** If the 115V or 24V AC power leads are reversed, the furnace will fail to operate. The diagnostic light code for this problem is **six flashes** followed by a pause. The probable cause is either the 115V AC power to furnace or integrated control module is reversed, the 24V AC orange and gray wires to transformer are reversed, or poor unit ground.
8. **Low Flame Sense Signal.** *(White-Rodgers 50A55/50T55 Control Only).* If the furnace continues to operate and the micro-amp signal from the flame sensor falls below specified level. The diagnostic light code for this problem is **seven flashes** followed by a pause. The probable cause is either a coated/oxidized sensor, incorrectly positioned sensor in burner flame or lazy burner flame due to improper gas pressure or combustion air.
9. **Pressure Switch Opened Five Times During A Single Call for Heat.** If the furnace fails to operate due to pressure switch opening five times during a single call for heat. The diagnostic light code for this problem is **eight flashes** followed by a pause. The probable cause is either the pressure switch hose is blocked, pinched, or misconnected, blocked flue or drain system, weak induced draft blower, incorrect pressure switch set point or faulty pressure switch, or loose or misconnected wiring.

NOTE: There is a twenty minute lockout if the pressure switch has tripped five times during a single call for heat.

10. **Primary or Auxiliary Limit Opened Five Times During a Single Call for Heat.** *(Heatcraft HSI-2 Control Only)*. If the furnace fails to operate due to primary or auxiliary limit opening five times during a single call for heat, the control will run the air circulation blower continuously with no further furnace operation. The diagnostic light code for this problem is **nine flashes** followed by a pause. The probable cause is either low conditioned air flow due to dirty filter(s) or resistance in duct work, faulty limit, faulty blower, or blower speed set to low.

NOTE: There is a one hour lockout if either the primary or auxiliary limit has tripped five times during a single call for heat.

11. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized, it will run the air circulation blower and the induced draft blower continuously with no further furnace operation. The diagnostic flash code for this is a **continuous flash**. The probable causes are either a short to ground in flame sense circuit, miswiring, lingering burner flame or a slow closing gas valve.

NORMAL SEQUENCE OF OPERATION

(80% or 90% Models with White-Rodgers 50A65 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized causing pressure switch contacts to close. Humidifier terminals are energized with induced draft blower.
4. Ignitor warm up begins upon close of pressure switch contacts.
5. Gas valve opens at end of ignitor warm up period, delivering gas to burners and establishing flame.
6. Integrated control module monitors flame presence. Gas valve will remain open only if flame is sensed.
7. Circulator blower is energized on heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat.
10. Gas valve closes, extinguishing flame.
11. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
12. Circulator blower is de-energized following a selectable heat off delay period (60, 90, 120, or 180 seconds). Electronic air cleaner terminals are de-energized.
13. Furnace awaits next call from thermostat.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period. Electronic air cleaner terminals are de-energized.
9. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on cool speed. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

Troubleshooting Chart for 50A55 & HSI-2 Integrated Ignition Controls

Symptoms of Abnormal Operation	Associated Red LED Code (See Note 2)	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Furnace fails to operate. and - Integrated control module RED diagnostic LED provides no signal.	None	- No 115 V power to furnace, or no 24 V power to integrated control module. - Blown fuse, or circuit breaker. - No signal from thermostat.	- Manual disconnect switch OFF, door switch open, or 24 V wires miswired or loose. - Blown fuse, or circuit breaker. - Improper thermostat connection or setting.	- Assure 115 V and 24 V power to furnace and integrated control module. - Check integrated control module fuse (3 A). Replace if necessary. - Check for possible shorts in 115 V and 24 V circuits. Repair as necessary.	- Turn power OFF prior to repair. - Replace integrated control module fuse with 3 A automotive style fuse.
- Furnace fails to operate. and - Integrated control modulE RED diagnostic LED is lit continuously.	ON Continuous On	- Integrated control module has an internal fault.	- Integrated control module has an internal fault.	- Replace bad integrated control module with known good control module.	- Turn power OFF prior to repair. - Read precautions in "Electrostatic Discharge" section of manual.
- Furnace is not operating and - Integrated control module RED diagnostic LED is flashing one flash.	1 1 Flash	- Furnace lockout due to an excessive number of ignition "retries" (3 total attempts), or "recycles" (5 total recycles). See note 1.	- Failure to establish flame. Cause may be no gas to burners, front cover pressure switch stuck open, bad ignitor or ignitor alignment, improper orifices, or coated/ oxidized or misconnected flame sensor. - Loss of flame after establishment.	- Locate and correct gas interruption. - Check front cover pressure switch operation (hose, wiring, contact operation). Correct if necessary. - Replace or realign ignitor. - Check flame sense signal. Sand sensor if coated/oxidized. - Check flue p	- Turn power OFF prior to repair. - Ignitor is fragile, handle with care. - Sand flame sensor with steel wool. - See "Flue and Combustion Air Pipe" section for piping details.
- Furnace fails to operate. and - Integrated control module RED diagnostic LED is flashing two flashes.	2 2 Flashes	- Pressure switch circuit is closed even though induced draft blower is not operating.	- Induced draft blower pressure switch contacts sticking. - Shorts in pressure switch circuit.	- Replace induced draft blower pressure switch if bad. - Check for and correct shorted wiring.	- Turn power OFF prior to repair. - Replace pressure switch with proper replacement part.
- Induced draft blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing three flashes.	3 3 Flashes	- Pressure switch circuit does not close in response to induced draft blower operation.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect pressure switch set point or malfunctioning switch contacts. - Loose or incorr	- Check and correct pressure switch hose. - Check flue and/or inlet air piping for blockage, proper length, elbows and termination. Check drain system. - Verify proper pressure switch set point and contact motion. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace pressure switch with proper replacement part.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing four flashes.	4 4 Flashes	- Primary limit circuit is open. (Primary or auxiliary limit).	- Insufficient conditioned air over the heat exchanger. - Cause may be blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower. - Loose or misconnected wiring.	- Check filters and ductwork for blockage. Clean filters or remove obstruction. - Check for proper circulator blower speed and performance. Correct speed or replace blower if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See Specification Sheet for allowable rise range and proper circulator blower speed.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing five flashes.	5 5 Flashes	- Rollout limit circuit is open.	- Rollout limit(s) is(are) open due to flame rollout. Cause may be misaligned burners, blocked flue and/or air inlet pipe, or failed induced draft blower. - Loose or misconnected wiring.	- Check burners for proper alignment. - Check flue and/or air inlet piping for blockage, proper length, elbows, and termination. - Check induced draft blower for proper performance. Replace if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace induced draft blower with proper replacement part.

NOTES:

1) Integrated control module will automatically attempt to reset from lock out after one hour.
2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.
3) Integrated control module will automatically attempt to reset from lock out after 20 minutes.

CHART CONTINUED ON NEXT PAGE

CHART CONTINUED FROM PREVIOUS PAGE

Troubleshooting Chart for 50A51-225 & 50A51-235 Integrated Ignition Controls

Symptoms of Abnormal Operation	Associated Red LED Code (See Note 2)	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Furnace fails to operate. and - Integrated control module RED diagnostic LED provides no signal.	None	- No 115 V power to furnace, or no 24 V power to integrated control module. - Blown fuse, or circuit breaker. - No signal from thermostat.	- Manual disconnect switch OFF, door switch open, or 24 V wires miswired or loose. - Blown fuse, or circuit breaker. - Improper thermostat connection or setting.	- Assure 115 V and 24 V power to furnace and integrated control module. - Check integrated control module fuse (3 A). Replace if necessary. - Check for possible shorts in 115 V and 24 V circuits. Repair as necessary.	- Turn power OFF prior to repair. - Replace integrated control module fuse with 3 A automotive style fuse.
- Furnace fails to operate. and - Integrated control module RED diagnostic LED is lit continuously.	ON Continuous On	- Integrated control module has an internal fault.	- Integrated control module has an internal fault.	- Replace bad integrated control module with known good control module.	- Turn power OFF prior to repair. - Read precautions in "Electrostatic Discharge" section of manual.
- Furnace is not operating and - Integrated control module RED diagnostic LED is flashing one flash.	1 1 Flash	- Furnace lockout due to an excessive number of ignition "retries" (3 total attempts), or "recycles" (5 total recycles). See note 1 & 2.	- Failure to establish flame. Cause may be no gas to burners, front cover pressure switch stuck open, bad ignitor or ignitor alignment, improper orifices, or coated/ oxidized or misconnected flame sensor. - Loss of flame after establishment.	- Locate and correct gas interruption. - Check front cover pressure switch operation (hose, wiring, contact operation). Correct if necessary. - Replace or realign igniter. - Check flame sense signal. Sand sensor if coated/oxidized. - Check flue p	- Turn power OFF prior to repair. - Ignitor is fragile, handle with care. - Sand flame sensor with steel wool. - See "Flue and Combustion Air Pipe" section for piping details.
- Furnace fails to operate. and - Integrated control module RED diagnostic LED is flashing two flashes.	2 2 Flashes	- Pressure switch circuit is closed even though induced draft blower is not operating.	- Induced draft blower pressure switch contacts sticking. - Shorts in pressure switch circuit.	- Replace induced draft blower pressure switch if bad. - Check for and correct shorted wiring.	- Turn power OFF prior to repair. - Replace pressure switch with proper replacement part.
- Induced draft blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing three flashes.	3 3 Flashes	- Pressure switch circuit does not close in response to induced draft blower operation.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect pressure switch set point or malfunctioning switch contacts. - Loose or incorre	- Check and correct pressure switch hose. - Check flue and/or inlet air piping for blockage, proper length, elbows and termination. Check drain system. - Verify proper pressure switch set point and contact motion. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace pressure switch with proper replacement part.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing four flashes.	4 4 Flashes	- Primary limit circuit is open. (Primary or auxiliary limit).	- Insufficient conditioned air over the heat exchanger. - Cause may be blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower. - Loose or misconnected wiring.	- Check filters and ductwork for blockage. Clean filters or remove obstruction. - Check for proper circulator blower speed and performance. Correct speed or replace blower if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See Specification Sheet for allowable rise range and proper circulator blower speed.
		- Rollout limit circuit is open.	- Rollout limit(s) is(are) open due to flame rollout. Cause may be misaligned burners, blocked flue and/or air inlet pipe, or failed induced draft blower. - Loose or misconnected wiring.	- Check burners for proper alignment. - Check flue and/or air inlet piping for blockage, proper length, elbows, and termination. - Check induced draft blower for proper performance. Replace if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace induced draft blower with proper replacement part.
- Induced draft and circulator blower run continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing continuously.	C Continuous Flashing	- Flame has been sensed with no call for heat.	- Short to ground in flame sense circuit. - Lingering burner flame. - Slow closing gas valve.	- Correct short at flame sensor or in flame sensor wiring. - Check for lingering flame. - Verify proper operation of gas valve.	- Turn power OFF prior to repair.

NOTES:

1) Integrated control module will automatically attempt to reset from lock out after one hour.
2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.
3) Integrated control module will automatically attempt to reset from lock out after 20 minutes.

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(80% Models with White-Rodgers 50A52 Radiant Sense Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module monitors safety circuits continuously.
4. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized causing pressure switch contacts to close. Humidifier terminals are energized with induced draft blower.
4. Ignitor warm up begins upon close of pressure switch contacts. It will heat for at least 17 seconds, and will continue to heat until the radiant sensor determines the ignitor is hot enough (i.e., until a heat signal is produced).
5. Gas valve opens at end of ignitor warm up period, delivering gas to burners and establishing flame. One second after the gas valve opens, the ignitor is de-energized.
6. The radiant sensor monitors the flame. As long as flame is present and the call for heat continues, the gas valve will remain open. Either a hot ignitor or a flame can produce a heat signal. Gas valve will remain open only if flame is sensed.
7. Circulator blower is energized on heat speed 45 seconds after the gas valve opens.
8. Furnace runs, integrated control module monitors safety circuits continuously.
9. R and W thermostat contacts open, completing the call for heat.
10. Gas valve closes, extinguishing flame and the induced draft blower is de-energized.
11. Circulator blower is de-energized 90 seconds after the gas valve closes.
12. Furnace awaits next call from thermostat.

Cooling Mode

The normal operational sequence in cooling mode is as follows:

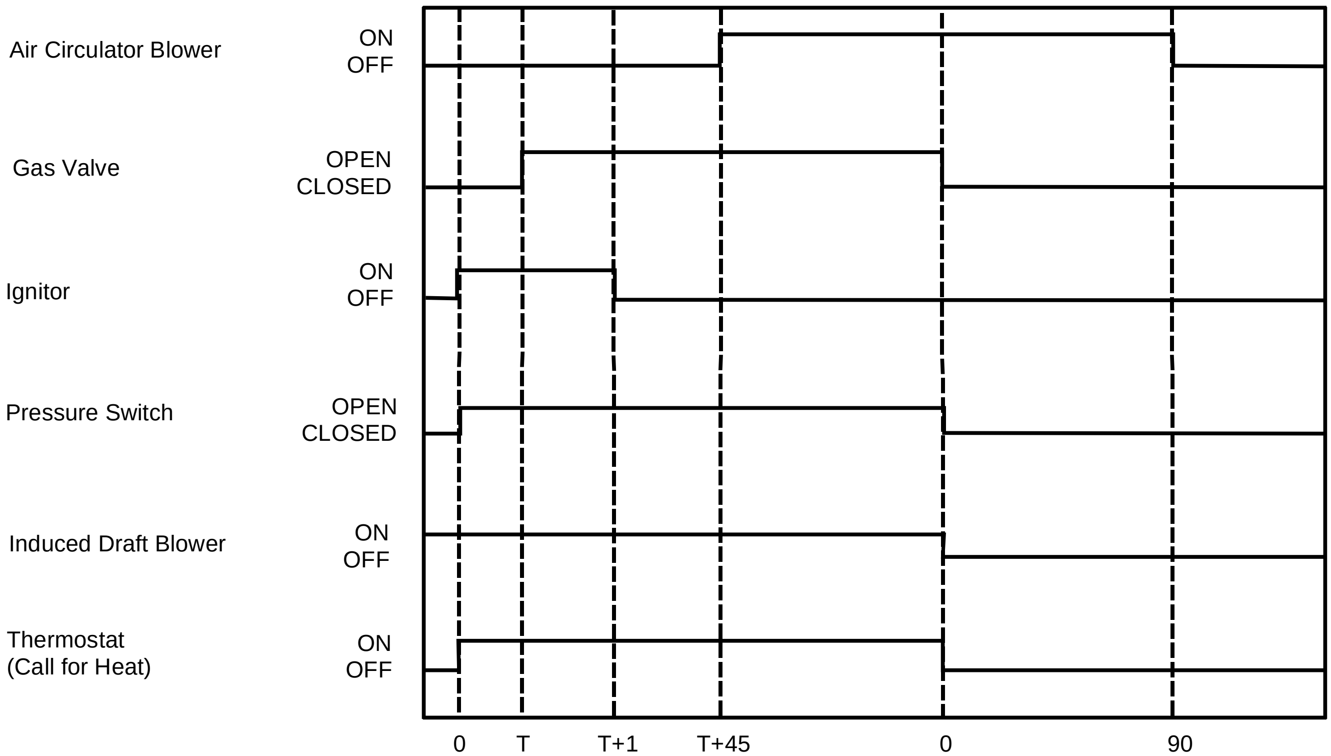
1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized on cool speed following a fixed five second on delay.
5. Furnace circulator blower and outdoor cooling unit run, integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period.
9. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

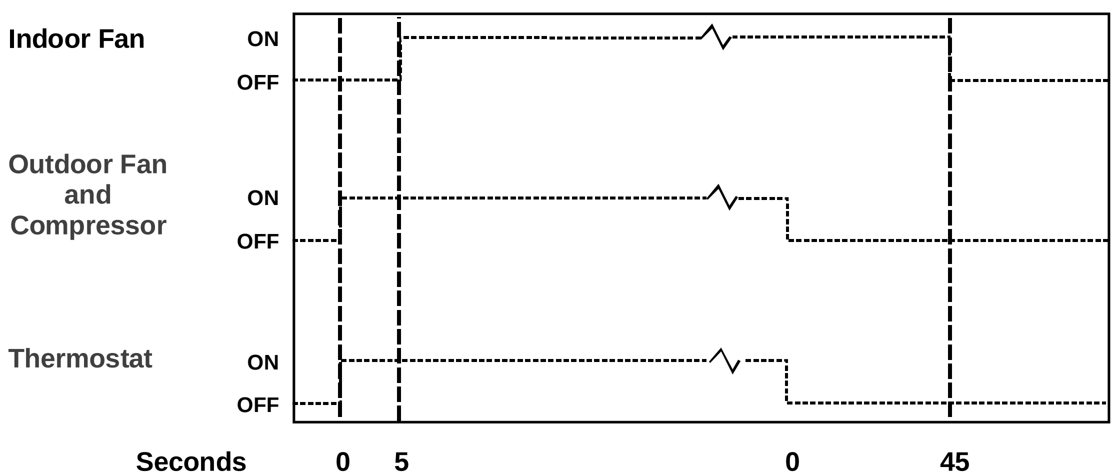
1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on cool speed.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized.
7. Furnace awaits next call from thermostat.

HEATING TIMING CHART FOR WHITE-RODGERS 50A52 RADIANT SENSE IGNITION CONTROL



T = 17 Seconds (Minimum) - 90 Seconds (Maximum)
Normal Operation, T = 17 Seconds or Slightly Longer

COOLING TIMING CHART FOR WHITE-RODGERS 50A52 RADIANT SENSE IGNITION CONTROL



SYSTEM OPERATION

ABNORMAL OPERATION

(80% Models with White-Rodgers 50A52 Radiant Sense Ignition Control)

1. **Internal Control Failure.** The system will lockout
2. **Pressure Switch Stuck Closed.** If the control senses that the pressure switch is closed while the induced draft blower is off, it waits until the switch opens—until then, no heating components are energized. The probable cause is either bad pressure switch or miswiring.
3. **Pressure Switch Stuck Open.** If the induced draft blower is energized and the pressure switch does not close, the control will keep the induced draft blower running until the switch closes—until then, no other heating components will be energized. The probable cause is either disconnected hose to pressure switch, restricted vent system, bad pressure switch or miswiring.
4. **Ignitor failure.** If the ignitor will not produce a heat signal within 90 seconds, the control will hold the gas valve closed and the system will lockout. The probable cause is either cracked ignitor, miswiring, or faulty radiant sensor.
5. **Flame lost within 90 seconds.** If the heat signal is lost (while the call for heat continues) from 0 to 90 seconds after the gas valve opens, the system will retry once. The probable cause is either the gas valve manually closed, air in gas line, incorrect gas pressures, incorrect burner alignment, incorrect burner gap, faulty gas valve, or faulty radiant sensor.

   During a retry, the gas valve closes, and the induced draft blower runs for 60 seconds. After the 60 seconds are up, a new ignition sequence begins. The system will only retry once. If the retry does not produce a flame that lasts for at least 90 seconds, the furnace will lockout.
6. **Flame lost later than 90 seconds.** If the heat signal is lost (while the call for heat continues) more than 90 seconds after the gas valve opens, the system will recycle.

   During a recycle, the gas valve closes, and a new ignition sequence begins. No matter how many recycles may occur, this alone will not cause the furnace to lockout.
7. **Trip on High Limit or Auxiliary Limit.** If the high limit or auxiliary limit control opens during a heating cycle, the gas valve closes. The induced draft blower runs, and the air circulator blower runs at "Heating" speed. This continues until the limit closes (Note: Auxiliary limit is manual reset, so it will never close on its own.). When the limit closes, the induced draft blower shuts off immediately, but the air circulator blower continues to run for 90 seconds. After this 90 second cool down is completed, a normal heating sequence can begin. The probable cause is either low airflow due to dirty filter, dirty coil, or restricted ductwork or blower speed set too low, gas input set too high, faulty limit or faulty blower.
8. **Interruption of Power Supply.** If the line voltage power is interrupted, the gas valve closes. It will remain closed until line voltage power is restored and a low voltage call for heat occurs at the room thermostat. At that time, a new ignition sequence will begin.
9. **Open Rollout Thermostat.** If the rollout thermostat opens during a heating cycle, the gas valve closes. The induced draft blower runs, and the air circulator blower runs at "Heating" speed (same symptoms as trip on high limit). This will continue until the rollout thermostat is manually reset. The probable cause is either incorrect gas pressures, improper burner alignment, faulty orifice(s), or restricted crossover gap(s).

OTHER ITEMS

A. **Lockout (see previous Numbers 1, 4, 5).** The gas valve, ignitor, and induced draft blower are de-energized immediately (Exception: If a trip on high/auxiliary/rollout limit is combined with a lockout, the induced blower will remain energized until the limit closes.). The air circulator blower runs for 90 seconds, and then shuts off.

   To manually end a lockout, interrupt the call for heat for at least 1 second, but not more than 20 seconds.

   To automatically end a lockout, wait three hours. The control will automatically reset itself and try again.

B. **Constant Fan.** During normal operation, the air circulation blower will continually run at "Cooling" speed as long as power is present at terminal G. If a call for heat occurs, the blower will continue to run at cooling speed throughout the heating cycle.

   If a trip on high/auxiliary/rollout limit occurs, the air circulation blower will run at "Heating" speed. Even if power is present at the G terminal the blower will run at heating speed until the limit closes.

C. **Cooling Operation.** With the thermostat in the COOL; FAN-AUTO position, the air circulator blower will start and stop at the same time as the compressor. No fan time delay will occur.

D. **Fan On/Off Timings** are as described above. They are not adjustable.

IMPORTANT: If the furnace frequently has to be reset, it means that a problem exists that should be corrected.

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(80% Two-Stage Models with White-Rodgers 50A51-215 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W1 (or R and W1 and W2) thermostat contacts close, initiating a call for heat.
2. The induced draft blower is energized on high speed for a 10 second prepurge. Humidifier terminals are energized with induced draft blower.
3. The induced draft blower steps to low speed following prepurge. Low stage pressure switch contacts are closed.
4. The ignitor is energized and is allowed to preheat for 17 seconds.
5. The gas valve is energized delivering gas to the burners at the low stage heat flow rate.
6. The control checks for a signal from the flame sensor within seven seconds after the gas valve is energized (opens). Gas will only continue to flow if a signal is present.
7. The control checks the thermostat to see whether the call for heat is for low stage heat or high stage heat. If the call is for high stage heat, the induced draft blower is switched to high speed and the gas valve is energized on high flow rate.
8. The control waits 30 seconds and turns on the air circulator blower to the appropriate speed (high heat speed for high heat or low heat speed for low heat). Electronic air cleaner terminals are energized with the circulator blower.

   On some Amana® brand models, the high heat air circulator speed may be the same as the low heat circulator speed. These models are factory shipped to be within the rise range on both stages with the same air circulator speed.
9. The furnace is now operating on the specified stage called out by the two stage thermostat.
10. If the two stage thermostat changes the call from low heat to high heat, the control will immediately switch the vent blower motor, gas valve, and air circulating speed to their high stage setting.
11. If the two stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower motor to low speed and switch the flow rate on the gas valve to low. The air circulator blower will remain on high heating speed for thirty seconds before switching to the low heat circulating speed. The 30 second delay feature on the circulator speed eliminates the possibility of tripping the high (primary) limit when the high stage flue products are traveling through the heat exchanger upon a call for low stage heat.
12. R and W1 (or R and W1 and W2) thermostat contacts open, completing the call for heat.
13. The control turns the gas valve off, extinguishing flame.
14. After a five second delay while flue products are purged from the heat exchanger, the induced draft blower motor is turned off (the induced draft blower is on low speed during the five second post purge.) Humidifier terminals are de-energized.
15. The air circulator blower has an adjustable delay-off timing of 60, 90, 120, or 180 seconds (starting from the time the gas valve closes). The speed(s) run during this period depend on the last heat call seen by the thermostat.

    If the last call for heat was a call for low heat, the air circulator blower will run on the low heat speed for the duration of the adjusted delay-off timing (60, 90, 120, or 180 seconds).

    If the last call for heat was a call for high heat, the air circulating blower run on the high heating speed for thirty seconds and then switch to the low heating speed for the **balance** of the adjusted delay-off timing (30, 60, 90, or 150 seconds).
16. Electronic air cleaner terminals are de-energized.
17. Furnace awaits next call from thermostat.

SYSTEM OPERATION

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run and integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized. Electronic air cleaner terminals are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period.
9. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1 R and G thermostat contacts close, initiating a call for fan.

2. Integrated control module performs safety circuit checks.

3. Circulator blower is energized on low heat speed. Electronic air cleaner terminals are energized.

3. Circulator blower runs, integrated control module monitors safety circuits continuously.

4. R and G thermostat contacts open, completing the call for fan.

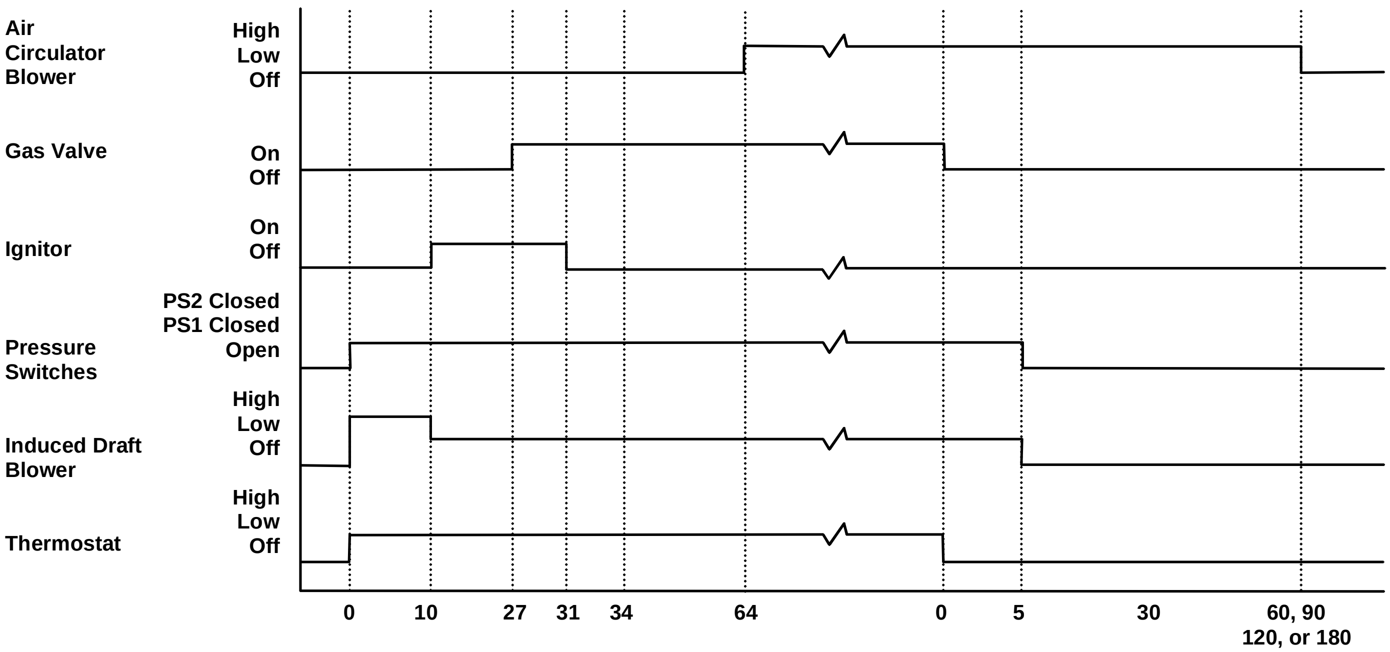
5. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.

6. Furnace awaits next call from thermostat.

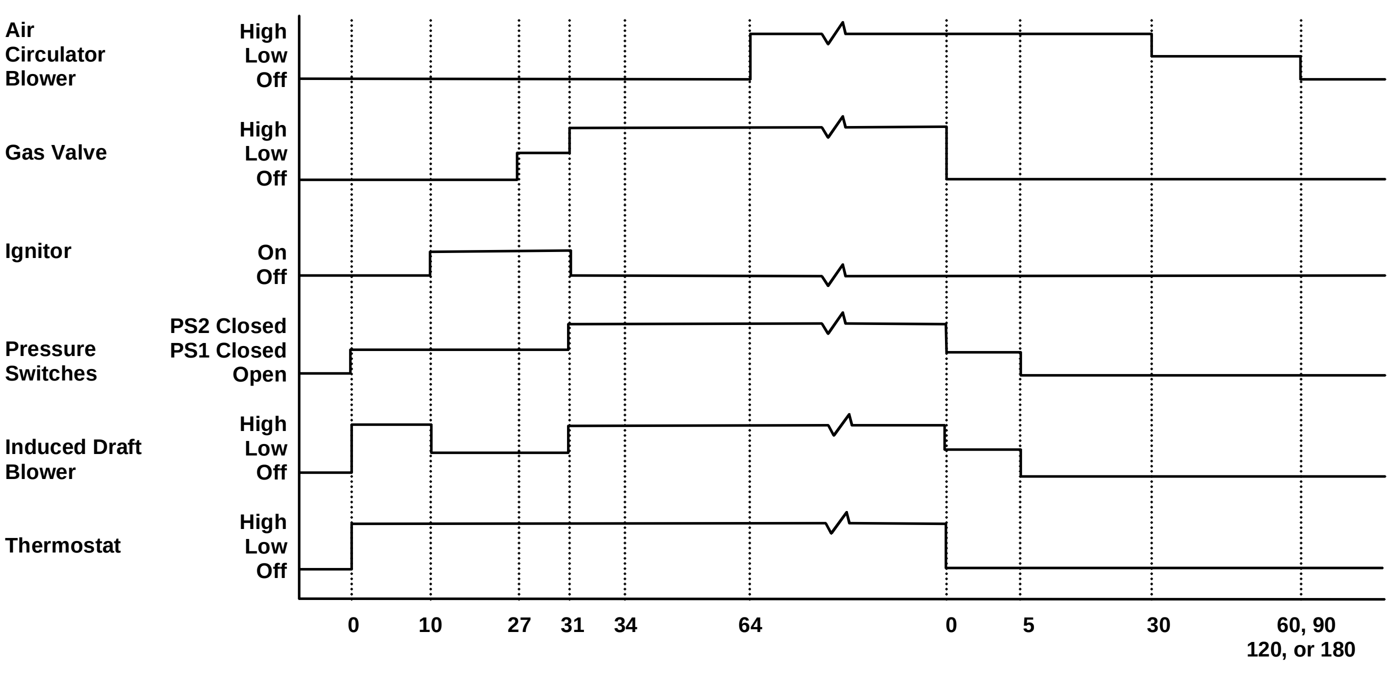
SYSTEM OPERATION

HEATING TIMING CHARTS FOR WHITE-RODGERS 50A51-215 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

GUIS/GCIS Example 1: Continuous Call For Low Stage Heat Only

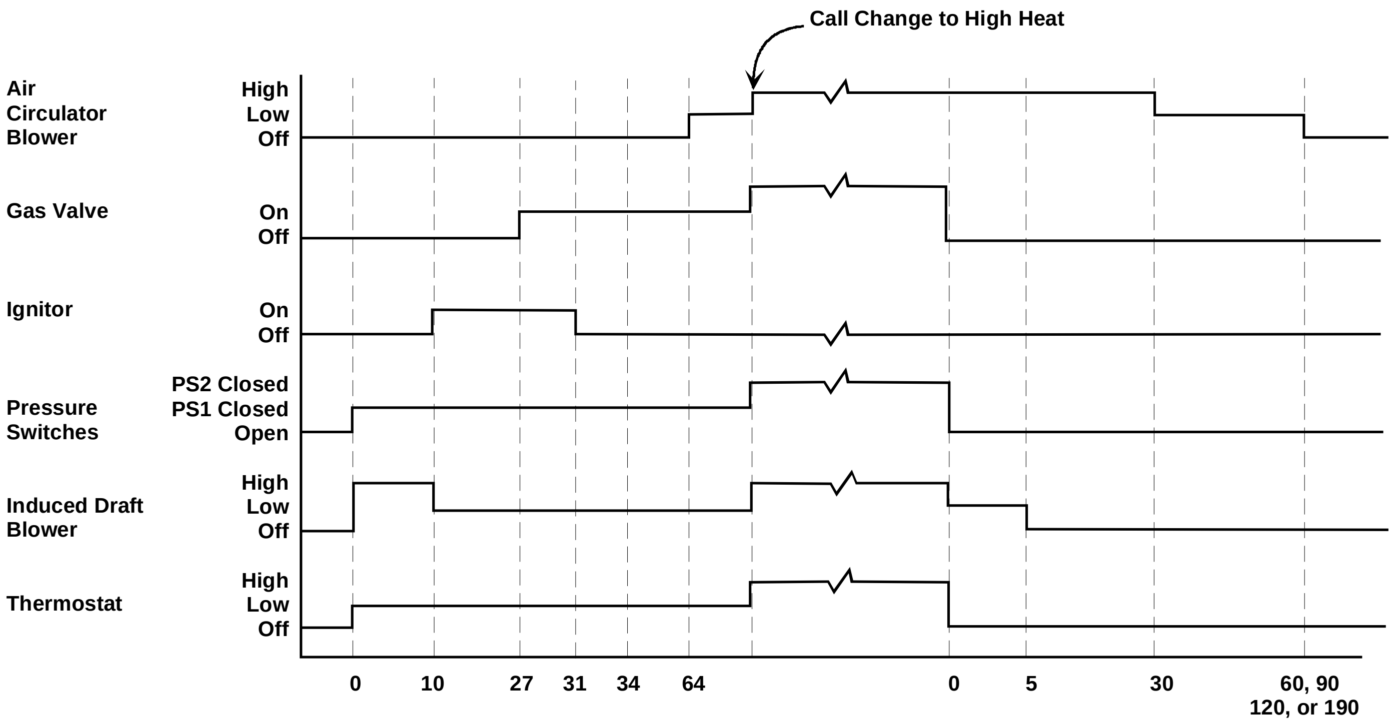


GUIS/GCIS Example 2: Continuous Call For High Stage Heat Only

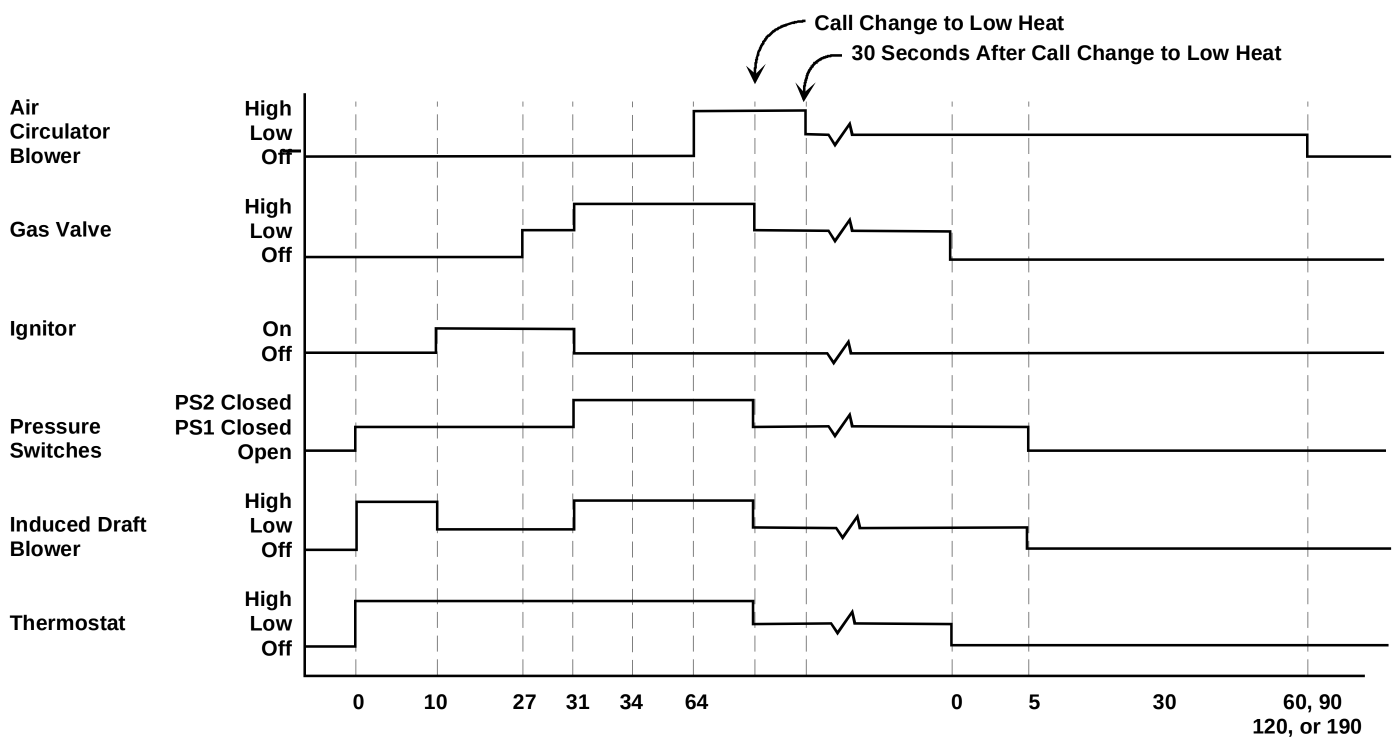


HEATING TIMING CHARTS FOR WHITE-RODGERS 50A51-215 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

GUIS/GCIS Example 3: Initial Call For Low Heat, Change In Call To High Heat

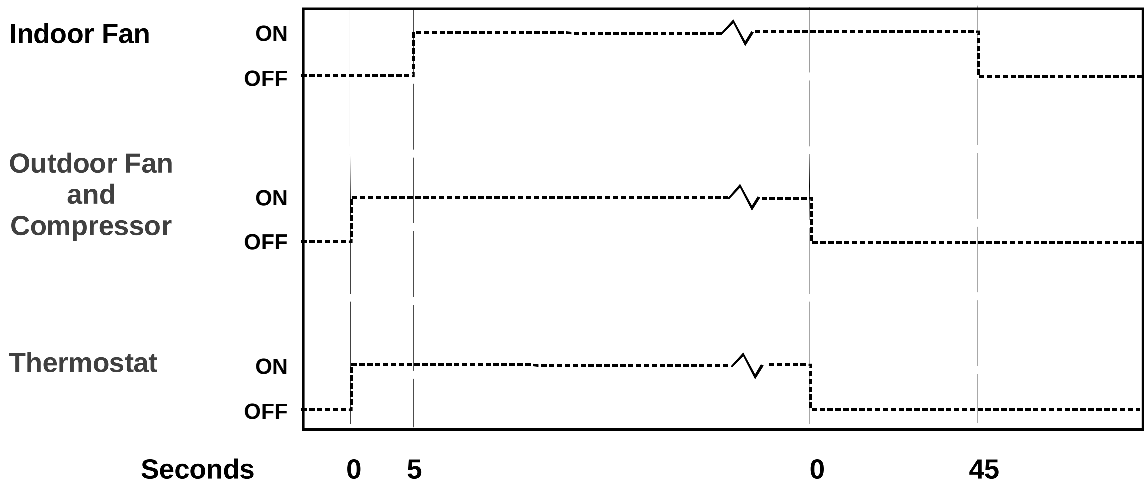


GUIS/GCIS Example 4: Initial Call For High Heat, Subsequent Call To Low Heat



SYSTEM OPERATION

COOLING TIMING CHART FOR WHITE-RODGERS 50A51-215 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION



SYSTEM OPERATION

ABNORMAL OPERATION

(80% Two Stage Models with White-Rodgers 50A51-215 Integrated Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *Diagnostic Signal Chart* below for an interpretation of the LED signals and to the information in this section for a description of the problem.

1. **Internal Lockout**. If, during a self test cycle, the control determines an internal fault, the control stops and the diagnostic light will **light continuously**. The control should be replaced.
2. **External Lockout.** If flame was not sensed during the first 7 seconds after the gas valve was energized, the control turns off the gas. There will be a 120 second delay with the induced draft blower motor energized to purge the heat exchanger. The ignitor will then be energized for 27 seconds. The gas valve will be energized on low stage flow rate. If flame is not sensed in 7 seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of *three tries* before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after 10 seconds, the control will recycle this series of *three tries four more times* before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

NOTE: The control board will automatically reset two hours after the lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected.

3. **Pressure Switch Stuck Closed.** If the control senses that either pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or miswiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the appropriate pressure switch does not close, the control will keep the blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a longer pause. The probable cause is either a restricted air intake, restricted flue piping, disconnected hose to pressure switches, miswiring, or faulty pressure switch.
5. **Open Thermal Protection Device.** If the primary (high) limit, auxiliary limit, or rollout limit control opens, the gas valve is de-energized. Both the induced draft blower motor and air circulator blower are energized on low heat speed. The diagnostic light code for this problem is **four short flashes** followed by a longer pause.

   If the primary or auxiliary limit is open, the probable cause is either: low conditioned air flow due to dirty filter or high resistance in duct work, faulty limit, faulty blower, or blower speed set too low. The primary limit will automatically reset, while the auxiliary limit control must be manually reset.

   If the rollout limit control is open, the probable cause is insufficient combustion air, restricted flue passage, or restricted heat exchanger. The rollout limit control must be manually reset.
6. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized it will run the induced draft blower and air circulator blower continuously on the low heat speed for each. The diagnostic light code for this problem is **continuous flashing**. The probable causes are either a short to ground in flame sense circuit, miswiring, lingering burner flame or a slow closing gas valve.

50A51 INTEGRATED IGNITION CONTROL DIAGNOSTIC SIGNAL CHART

LIGHT SIGNAL	FOR CORRECTIVE ACTION REFER TO ABNORMAL OPERATION NUMBER
Continuous Light	1. Internal Control Failure
1 Flash	2. System Lockout
2 Flashes	3. Pressure Switch Stuck Closed
3 Flashes	4. Pressure Switch Stuck Open
4 Flashes	5. Thermal Protection Device Open
Continuous Flashing	6. Flame Sensed No Call For Heat
	Stat Recovery (1/4 Second on, 1/4 Second Off)

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(80% Two-Stage Variable Speed Models with White-Rodgers 50A51-225 Integrated Ignition Control)

(90% Two-Stage Variable Speed Models with White-Rodgers 50A51-235 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W1 (or R and W1 and W2) thermostat contacts close, initiating a call for heat.
2. The induced draft blower is energized on high speed for a 10 second prepurge. Humidifier terminals are energized with induced draft blower.
3. The induce draft blower steps down to low speed following prepurge.
4. The ignitor is energized and is allowed to preheat for 17 seconds.
5. The gas valve is energized delivering gas to the burners at the low stage heat flow rate.
6. The control checks for a signal from the flame sensor within seven seconds after the gas valve is energized (opens). Gas will only continue to flow if a signal is present.
7. The control checks the thermostat to see whether the call for heat is for low stage heat or high stage heat. If the call is for high stage heat, the induced blower is switched to high speed and the gas valve is energized on high flow rate.
8. The control waits 30 seconds and turns on the air circulator blower to the appropriate speed (high heat speed for high heat or low heat speed for low heat). The circulator blower will take 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with the circulator blower.
9. The furnace is now operating on the specified stage called for by the two-stage thermostat.
10. If the two-stage thermostat changes the call from low heat to high heat, the control will immediately switch the induced draft blower motor, gas valve, and air circulating blower speed to their high stage setting.
11. If the two-stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower motor to low speed and switch the flow rate on the gas valve to low. The air circulator blower will remain on high heating speed for thirty seconds before switching to the low heat circulating speed. The 30 second delay feature on the circulator speed eliminates the possibility of tripping the high (primary) limit when the high stage flue products are traveling through the heat exchanger upon a call for low stage heat.
12. R and W1 (or R and W1 and W2) thermostat contacts open, completing the call for heat.
13. The control turns the gas valve off, extingushing flame.
14. After a five second delay while flue products are purged from the heat exchanger, the induced draft blower motor is turned off (the induced blower is on low speed during the five second post purge). Humidifier terminals are de-energized.
15. The air circulator blower fan has an adjustable delay-off timing of 60, 90, 120, or 180 seconds (starting from the time the gas valve closes). The speeds run during this period depend on the last heat call seen by the thermostat.

    If the last call for heat was a call for low heat, the air circulator blower will run on the low heat speed for the duration of the adjusted delay-off timing (60, 90, 120, or 180 seconds).

    If the last call for heat was a call for high heat, the air circulator blower will run on the high heating speed for thirty seconds and then switch to the low heating speed for the **balance** of the adjusted delay-off timing (30, 60, 90, or 150 seconds).

    Example: A GUIV090DX50 has the heating blower off delay set to 120 seconds by the installer. When the thermostat is satisfied after a call for high heat, the air circulator blower will run on high speed for 30 seconds and then switch to low circulator speed for 120 - 30 = 90 seconds.

    The adjustable delay-off timing allows for more heat transferred to the conditioned space from the furnace. After the delay time has elapsed, the air circulator blower is de-energized. The adjustable delay-off timing feature allows the installer to customize the comfort level based on the predominant staging requirements of the living space.
16. The air circulator blower will ramp down for another 30 seconds and shut down.
17. Electronic air cleaner terminals are de-energized.
18. Furnace awaits next call from thermostat.

SYSTEM OPERATION

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized following a fixed five second on delay. The circulator blower will take 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run and integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized. Electronic air cleaner terminals are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period. The air circulator blower will ramp down for another 30 seconds and shut down.
9. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1 R and G thermostat contacts close, initiating a call for fan.

2. Integrated control module performs safety circuit checks.

3. Circulator blower is energized on low heat speed. Electronic air cleaner terminals are energized.

3. Circulator blower runs, integrated control module monitors safety circuits continuously.

4. R and G thermostat contacts open, completing the call for fan.

5. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized. The air circulator blower will ramp down for another 30 seconds and shut down.

6. Furnace awaits next call from thermostat.

NORMAL SEQUENCE OF OPERATION

Dehumidification Mode

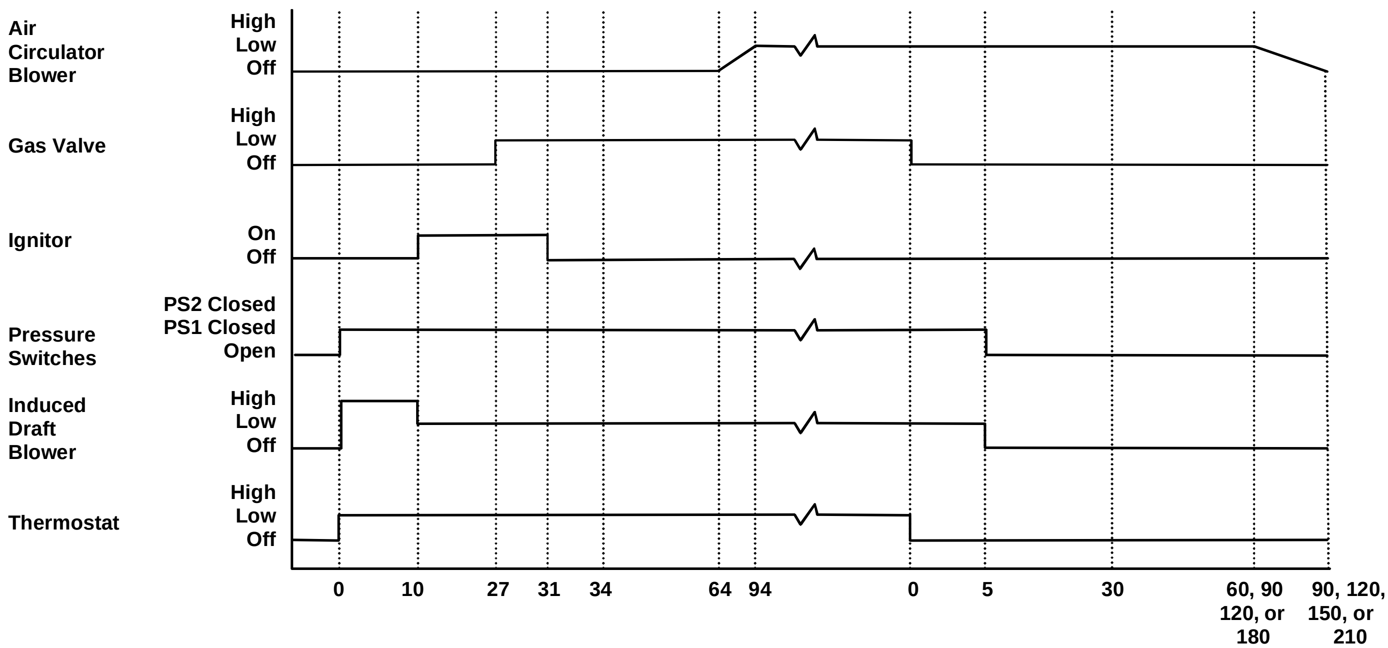
The normal operational sequence for dehumidification is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized following a fixed five second on delay. The circulator blower will take 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run and integrated control module monitors safety circuits continuously.
6. Dehumidistat opens on humidity rise. Motor applies a dehumidification factor of 80% to the cooling airflow demand causing the motor to operate at 80% of cooling airflow demand.
7. When humidity level falls below setting on dehumidistat, the dehumdistat closes allowing the motor to return to set cooling speed.
8. R and Y thermostat contacts open, completing the call for cool.
9. Outdoor fan and compressor are de-energized. Electronic air cleaner terminals are de-energized.
10. Circulator blower is de-energized following a fixed forty five second cool off delay period. The air circulator blower will ramp down for another 30 seconds and shut down.
11. Furnace awaits next call from thermostat.

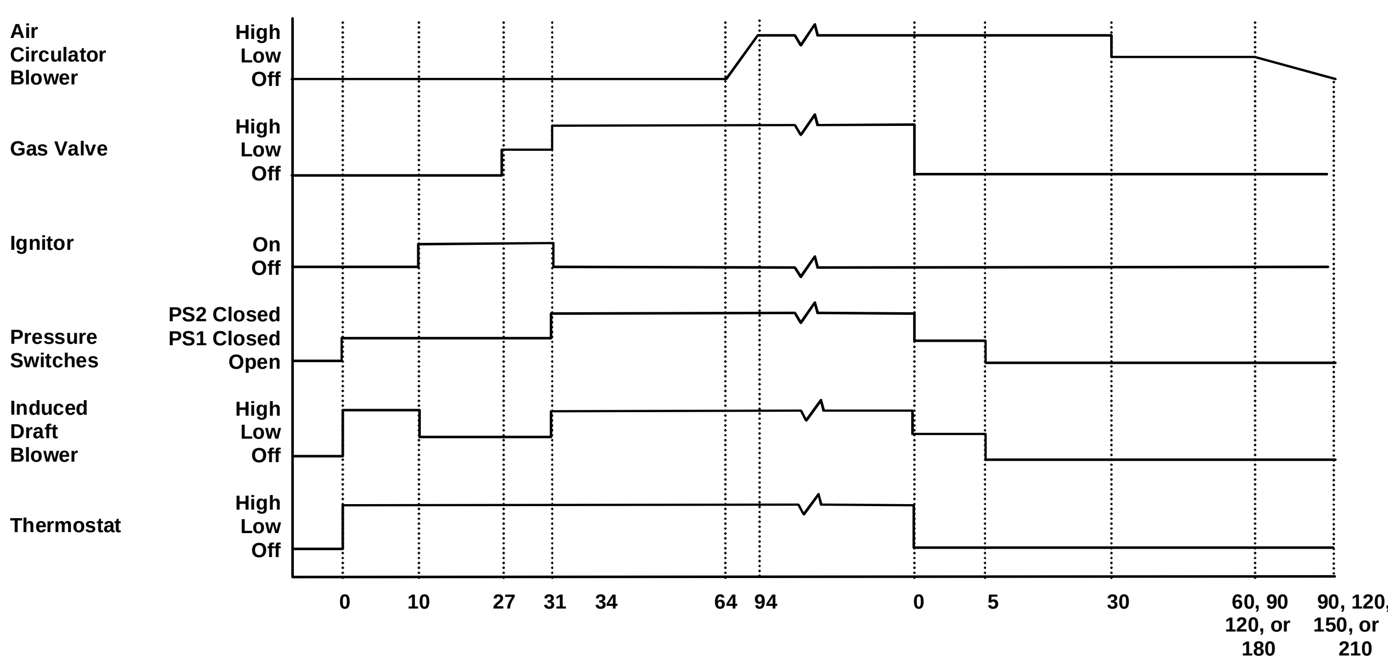
SYSTEM OPERATION

HEATING TIMING CHARTS FOR WHITE-RODGERS 50A51-225
TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 1: Continuous Call For Low Stage Heat Only



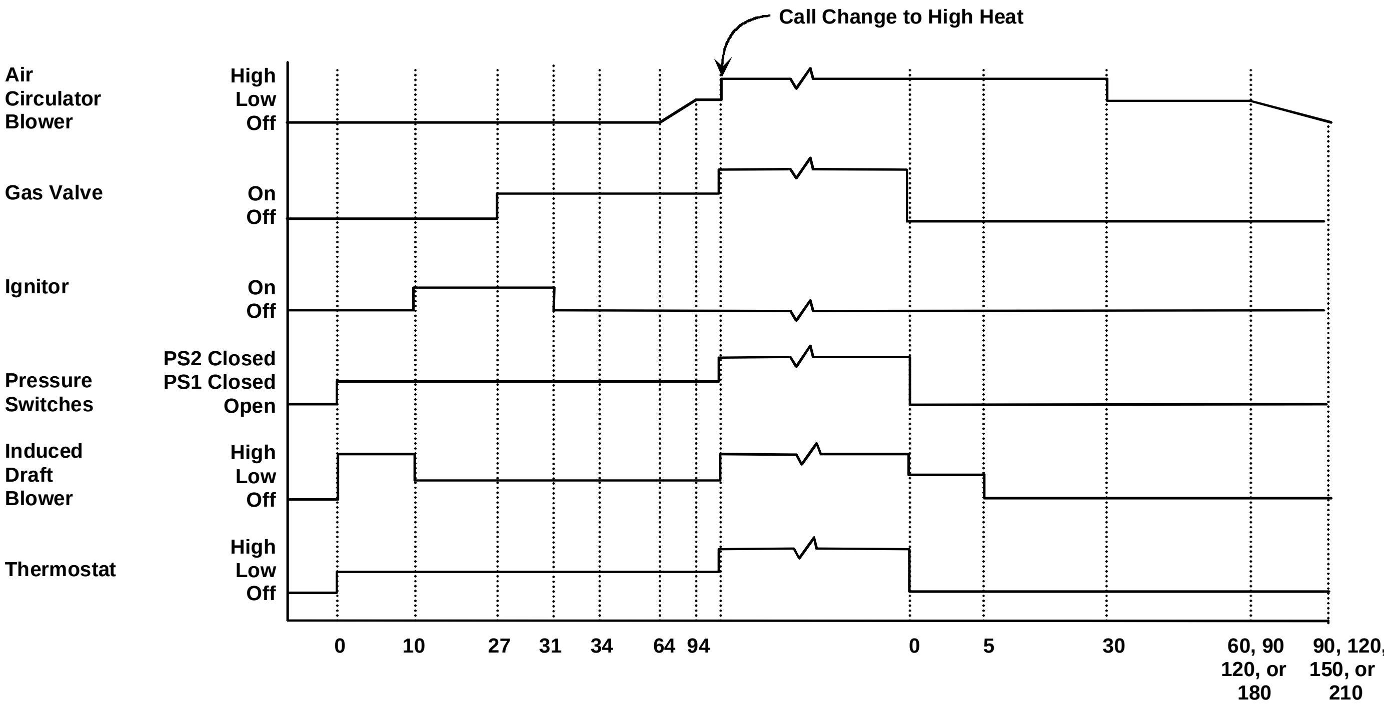
Example 2: Continuous Call For High Stage Heat Only



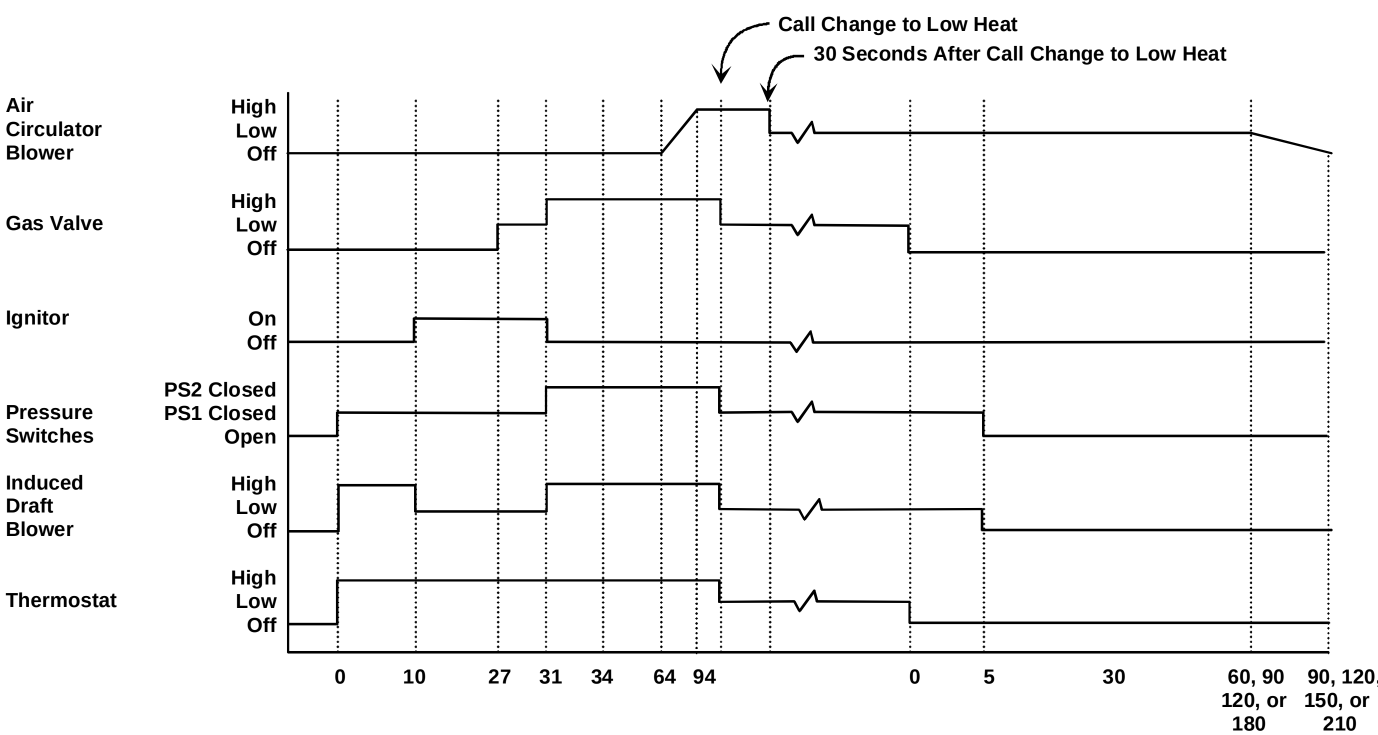
SYSTEM OPERATION

HEATING TIMING CHARTS FOR WHITE-RODGERS 50A51-225
TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 3: Initial Call For Low Heat, Change In Call To High Heat



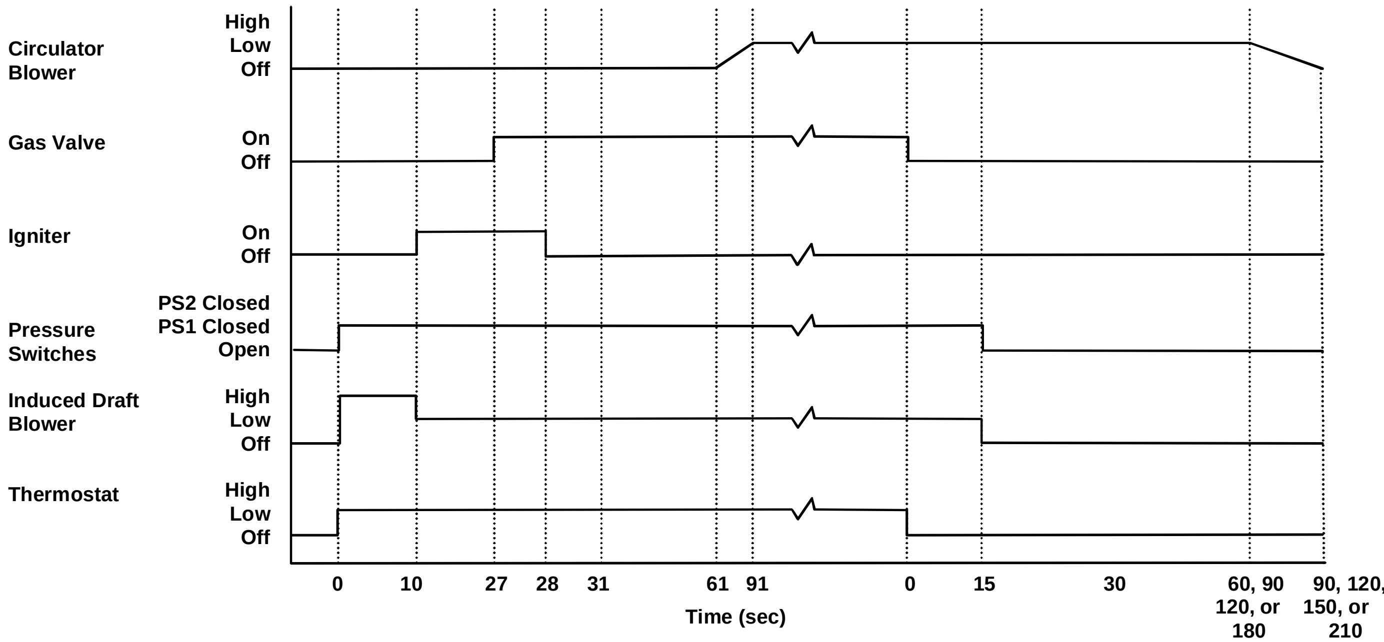
Example 4: Initial Call For High Heat, Subsequent Call To Low Heat



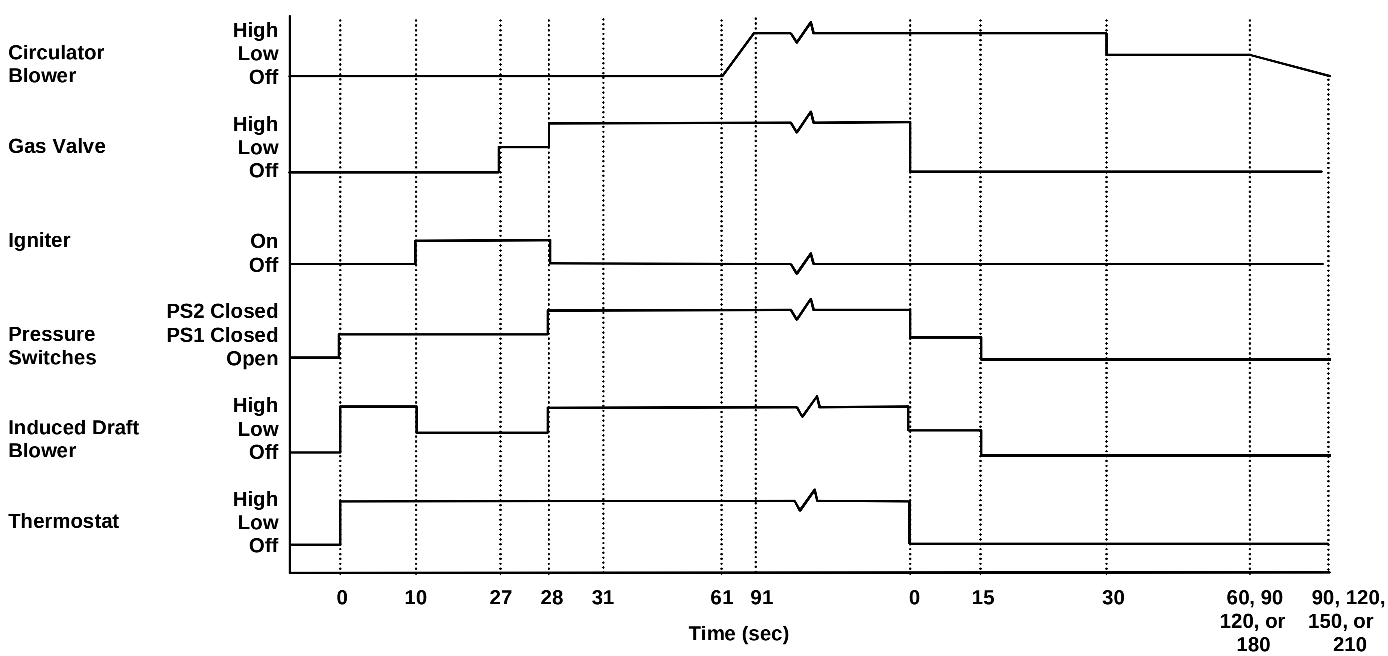
SYSTEM OPERATION

HEATING TIMING CHARTS FOR WHITE-RODGERS 50A51-235 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 1: Continuous Call For Low Stage Heat Only

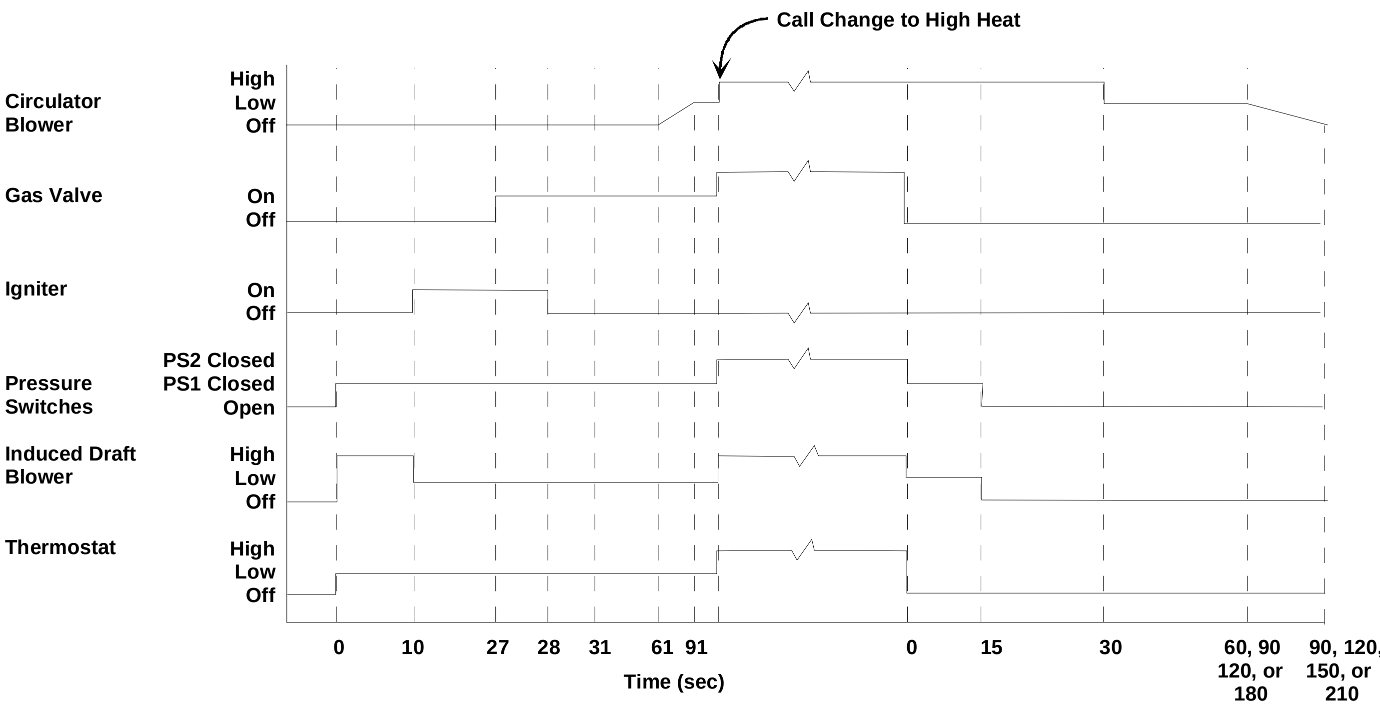


Example 2: Continuous Call For High Stage Heat Only

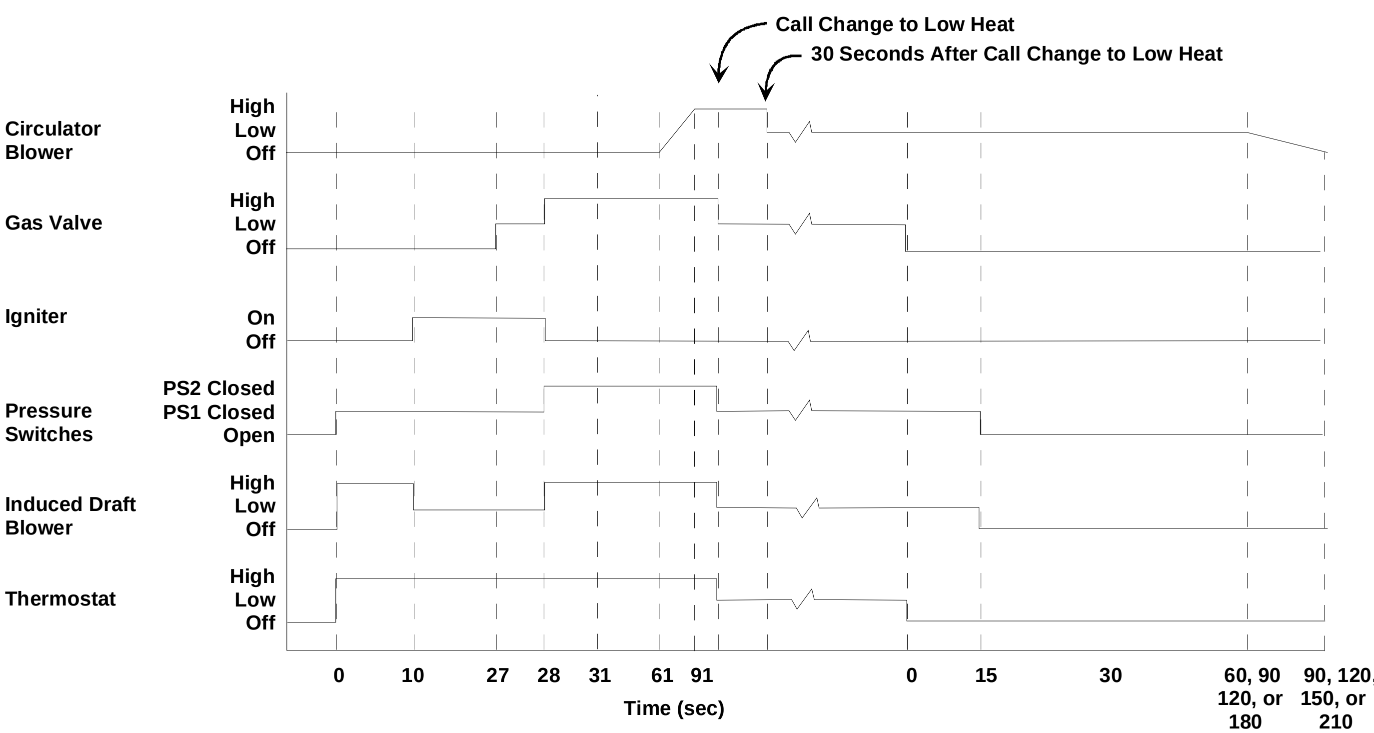


HEATING TIMING CHARTS FOR WHITE-RODGERS 50A51-235 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 3: Initial Call For Low Heat, Change In Call To High Heat

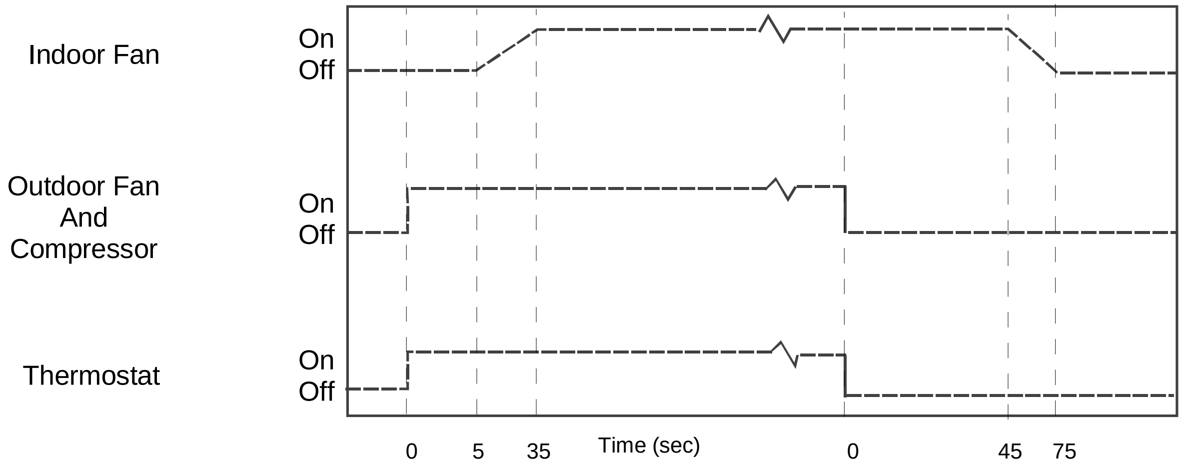


Example 4: Initial Call For High Heat, Subsequent Call To Low Heat

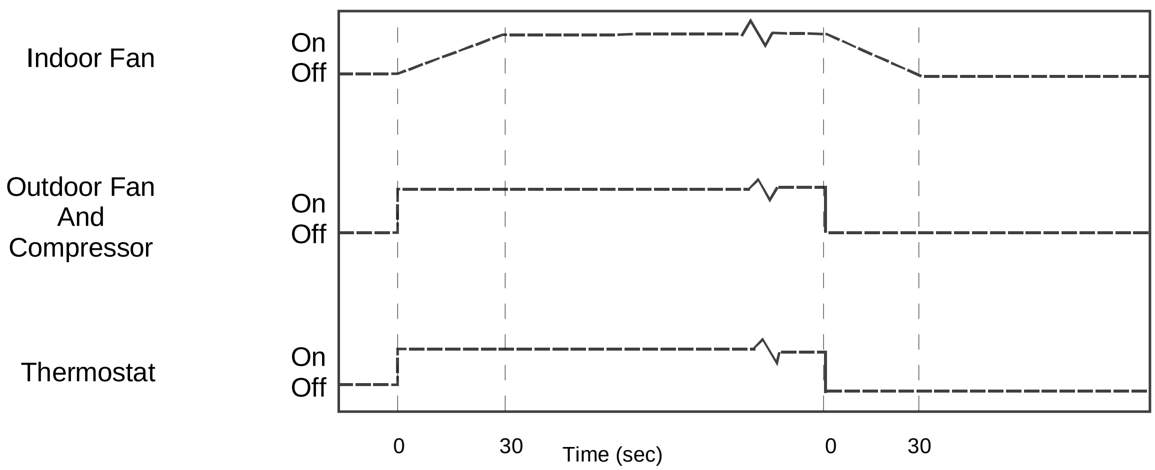


COOLING TIMING CHART FOR WHITE-RODGERS 50A51-225 & 50A51-235 TWO-STAGE VARIABLE SPEED INTEGRATED IGNITION CONTROL OPERATION

(With "Y" from the Thermostat Connected to "Y" on Integrated Ignition Control)



(With "Y" from the Thermostat Connected to "Y/Y2" on Circulator Blower Interface Board)



SYSTEM OPERATION

Abnormal Operation

(80% Two-Stage Variable Speed Models with White-Rodgers 50A51-225 Ignition Control)

(90% Two-Stage Variable Speed Models with White-Rodgers 50A51-235 Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *Troubleshooting Chart* on the following page for an interpretation of the LED signals and to the information in this section for a description of the problem.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes.** The control should be replaced.

2. **External Lockout.** An external lockout occurs when the integrated ignition control determines that a measurable combustion cannot be established or maintained after three consecutive tries (four, if flame is established then lost) to turn on the furnace.

   If a flame is not sensed during the first seven seconds after a gas valve has been energized, the ignition control will internally turn off the gas. After 120 seconds for 50A51-225 and after 60 seconds for 50A51-235, during which time the induced draft blower purges the heat exchanger, the ignitor will reenergize and preheat for 27 seconds. The gas valve is then reenergized. If a flame is not sensed again in seven seconds, the gas valve will de-energize and another purge is performed. The ignition control will cycle the gas valve *three times* before it determines it cannot establish measurable combustion and enter a lockout state. If a flame is sensed but lost after 10 seconds, the control will cycle *four more times* before locking out. A lockout stops ignition attempts and causes the air circulating blower to run continuously. The diagnostic light code for either problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also reset by turning off the electrical disconnect switch to the furnace for 30 seconds. The 50A51-225 control will reset after two hours and the 50A51-235 will reset after one hour.

IMPORTANT: If you have to frequently reset your furnace, it means that a problem exists that should be corrected. Contact a qualified servicer for further information.

3. **Pressure Switch Stuck Closed**. A sticking pressure switch can be caused by either a faulty pressure switch, faulty wiring, a disconnected hose, or a restricted intake or flue piping. In the case of a pressure switch sticking closed, the probable cause is a faulty pressure switch or wiring.

   If the ignition control senses that the pressure switch is closed and the induced draft blower is off, it will shut down the unit until the fault is corrected. The light code for this problem is **two short flashes** followed by a longer pause.

4. **Pressure Switch Stuck Open.** A sticking open pressure switch can be caused by a faulty pressure switch, a blocked, pinched or disconnected hose to the pressure switch, a restricted air intake or flue piping, or faulty wiring.

   If the ignition control senses that the induced draft blower is energized, but the pressure switch is not closed, the control will keep the blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause.

5. **Open Thermal Protection Device.** If the primary (high) limit, auxiliary limit, or rollout limit control opens, the gas valve is de-energized. Both the induced draft blower motor and air circulator blower are energized on low heat speed. The diagnostic light code for this problem is **four short flashes** followed by a longer pause.

   If the primary or auxiliary limit is open, the probable cause is either: low conditioned air flow due to dirty filter or high resistance in duct work, faulty limit, faulty blower, or blower speed set too low. The primary limit will automatically reset, while the auxiliary limit control must be manually reset.

   If the rollout limit control is open, the probable cause is insufficient combustion air, restricted flue passage, or restricted heat exchanger. The rollout limit control must be manually reset.

6. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized it will run the induced draft blower and air circulator blower continuously on the low heat speed for each. The diagnostic light code for this problem is **continuous flashing. The** probable causes are either a short to ground in flame sense circuit, miswiring, lingering burner flame or a slow closing gas valve.

Troubleshooting Chart for 50A51-225 & 50A51-235 Integrated Ignition Controls

Symptoms of Abnormal Operation	Associated Red LED Code (See Note 3)	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Furnace fails to operate. and - Integrated control module RED diagnostic LED provides no signal.	None	- No 115 V power to furnace, or no 24 V power to integrated control module. - Blown fuse, or circuit breaker. - No signal from thermostat.	- Manual disconnect switch OFF, door switch open, or 24 V wires miswired or loose. - Blown fuse, or circuit breaker. - Improper thermostat connection or setting.	- Assure 115 V and 24 V power to furnace and integrated control module. - Check integrated control module fuse (3 A). Replace if necessary. - Check for possible shorts in 115 V and 24 V circuits. Repair as necessary.	- Turn power OFF prior to repair. - Replace integrated control module fuse with 3 A automotive style fuse.
- Furnace fails to operate. and - Integrated control module RED diagnostic LED is lit continuously.	ON Continuous On	- Integrated control module has an internal fault.	- Integrated control module has an internal fault.	- Replace bad integrated control module with known good control module.	- Turn power OFF prior to repair. - Read precautions in "Electrostatic Discharge" section of manual.
- Furnace is not operating and - Integrated control module RED diagnostic LED is flashing one flash.	1 1 Flash	- Furnace lockout due to an excessive number of ignition "retries" (3 total attempts), or "recycles" (5 total recycles). See note 1 & 2.	- Failure to establish flame. Cause may be no gas to burners, front cover pressure switch stuck open, bad ignitor or ignitor alignment, improper orifices, or coated/ oxidized or misconnected flame sensor. - Loss of flame after establishment. Cause may be interrupted gas supply, lazy burner flames (improper gas pressure or restriction in flue and/or combustion air piping, front cover pressure switch opening, or improper induced draft blower performance.	- Locate and correct gas interruption. - Check front cover pressure switch operation (hose, wiring, contact operation). Correct if necessary. - Replace or realign igniter. - Check flame sense signal. Sand sensor if coated/oxidized. - Check flue piping for blockage, proper length, elbows, and termination. - Verify proper induced draft blower performance.	- Turn power OFF prior to repair. - Ignitor is fragile, handle with care. - Sand flame sensor with steel wool. - See "Flue and Combustion Air Pipe" section for piping details.
- Furnace fails to operate. and - Integrated control module RED diagnostic LED is flashing two flashes.	2 2 Flashes	- Pressure switch circuit is closed even though induced draft blower is not operating.	- Induced draft blower pressure switch contacts sticking. - Shorts in pressure switch circuit.	- Replace induced draft blower pressure switch if bad. - Check for and correct shorted wiring.	- Turn power OFF prior to repair. - Replace pressure switch with proper replacement part.
- Induced draft blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing three flashes.	3 3 Flashes	- Pressure switch circuit does not close in response to induced draft blower operation.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect pressure switch set point or malfunctioning switch contacts. - Loose or incorrect wiring.	- Check and correct pressure switch hose. - Check flue and/or inlet air piping for blockage, proper length, elbows and termination. Check drain system. - Verify proper pressure switch set point and contact motion. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace pressure switch with proper replacement part.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing four flashes.	4 4 Flashes	- Primary limit circuit is open. (Primary or auxiliary limit).	- Insufficient conditioned air over the heat exchanger. - Cause may be blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower. - Loose or misconnected wiring.	- Check filters and ductwork for blockage. Clean filters or remove obstruction. - Check for proper circulator blower speed and performance. Correct speed or replace blower if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See Specification Sheet for allowable rise range and proper circulator blower speed.
		- Rollout limit circuit is open.	- Rollout limit(s) is(are) open due to flame rollout. Cause may be misaligned burners, blocked flue and/or air inlet pipe, or failed induced draft blower. - Loose or misconnected wiring.	- Check burners for proper alignment. - Check flue and/or air inlet piping for blockage, proper length, elbows, and termination. - Check induced draft blower for proper performance. Replace if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace induced draft blower with proper replacement part.
- Induced draft and circulator blower run continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing continuously.	C Continuous Flashing	- Flame has been sensed with no call for heat.	- Short to ground in flame sense circuit. - Lingering burner flame. - Slow closing gas valve.	- Correct short at flame sensor or in flame sensor wiring. - Check for lingering flame. - Verify proper operation of gas valve.	- Turn power OFF prior to repair.

NOTES:

1) 50A51-235 Integrated control module will automatically attempt to reset from lock out after one hour.
2) 50A51-225 Integrated control module will automatically attempt to reset from lock out after two hours.
3) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(90% Two-Stage Models with White- Rodgers 50M61-288 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W1 (or R and W1 and W2) thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized on high speed for a 10-second prepurge. Humidifier terminals are energized with induced draft blower.
4. Induced draft blower steps to low speed following prepurge. Low stage pressure switch contacts are closed.
5. Ignitor warm up (20 seconds) begins upon step to low speed and presence of closed low stage pressure switch contacts.
6. After 20-second ignitor warm up period, low stage gas valve is energized (4-second ignition trial) delivering gas to burners and establishing flame. Ignitor remains on for 3 seconds after gas valve is opened (ignition activation period).
7. Integrated control module monitors flame presence and control begins timing 30-second heat on delay. Gas valve will remain open only if flame is sensed.
8. If the thermostat call is for low heat, gas valve and induced draft blower will continue on low stage. If the call is for high heat, the gas valve and induced draft blower will change to high stage .
9. Circulator blower is energized on the appropriate heat speed following a fixed thirty second blower on delay. Electronic air cleaner terminals are energized with circulator blower.
10. Furnace is now operating on the specified stage called for by the two-stage thermostat.
11. Furnace runs, integrated control module monitors safety circuits continuously.
12. If the two-stage thermostat changes the call from low heat to high heat, the integrated control module will immediately switch the induced draft blower, gas valve, and circulator blower to their high stage settings.
13. If the two-stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower and gas valve to their low stage settings. The circulator blower will remain on high heating speed for thirty seconds before switching to the low heat circulating speed.
14. R and W1 (or R and W1 and W2) thermostat contacts open, completing the call for heat.
15. Gas valve closes, extinguishing flame.
16. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
17. Circulator blower continues running for the selected heat off delay period (60, 90, 120, or 180 seconds). The speed run during this period depends on the last heat call provided by the thermostat.

    If the last call for heat was a call for low heat, the air circulator blower will run on the low heat speed for the duration of the heat off delay period (60, 90, 120, or 180 seconds).

    If the last call for heat was a call for high heat, the air circulator blower will run on the high heating speed for thirty seconds and then switch to the low heating speed for the **balance** of the heat off delay period (30, 60, 90, or 150 seconds).
18. Circulator blower and electronic air cleaner terminals are de-energized
19. Furnace awaits next call from thermostat.

SYSTEM OPERATION

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized following a fixed five second on delay. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run and integrated control module monitors safety circuits continuously.
6. R and Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized. Electronic air cleaner terminals are de-energized.
8. Circulator blower is de-energized following a fixed forty five second cool off delay period.
9. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1 R and G thermostat contacts close, initiating a call for fan.

2. Integrated control module performs safety circuit checks.

3. Circulator blower is energized on low heat speed. Electronic air cleaner terminals are energized.

3. Circulator blower runs, integrated control module monitors safety circuits continuously.

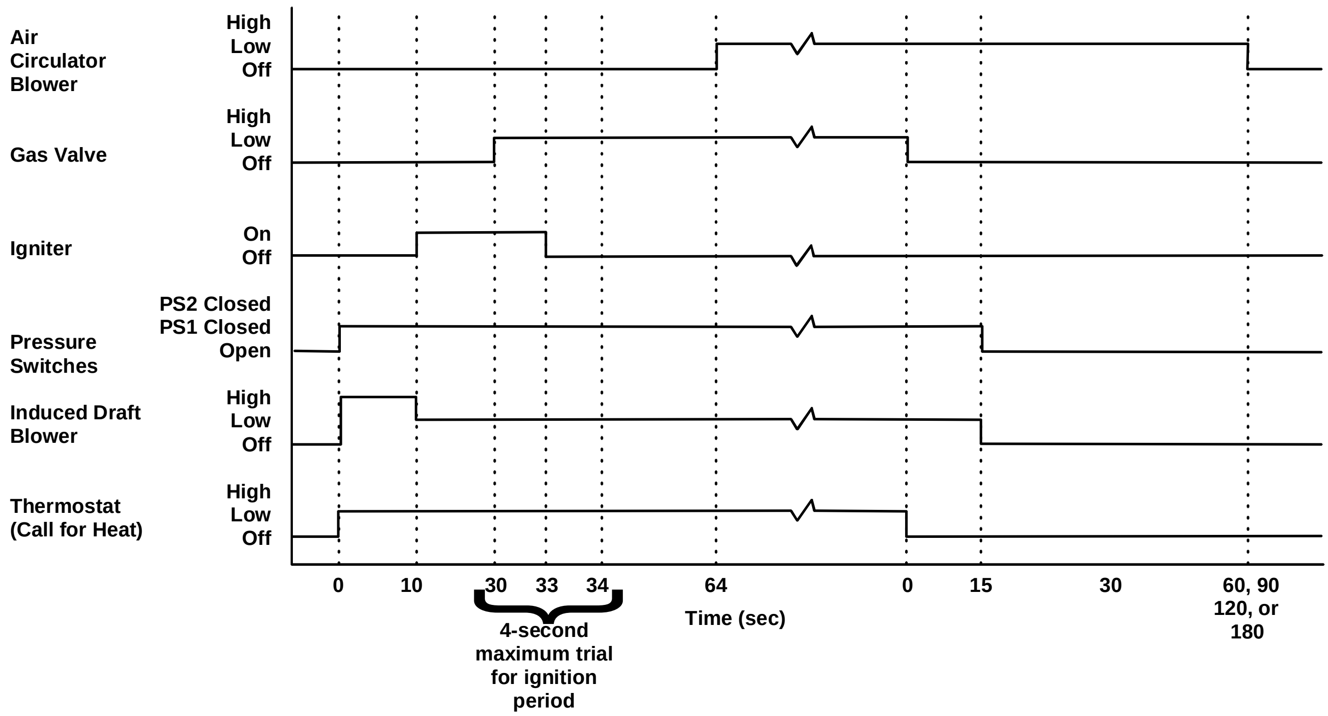
4. R and G thermostat contacts open, completing the call for fan.

5. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.

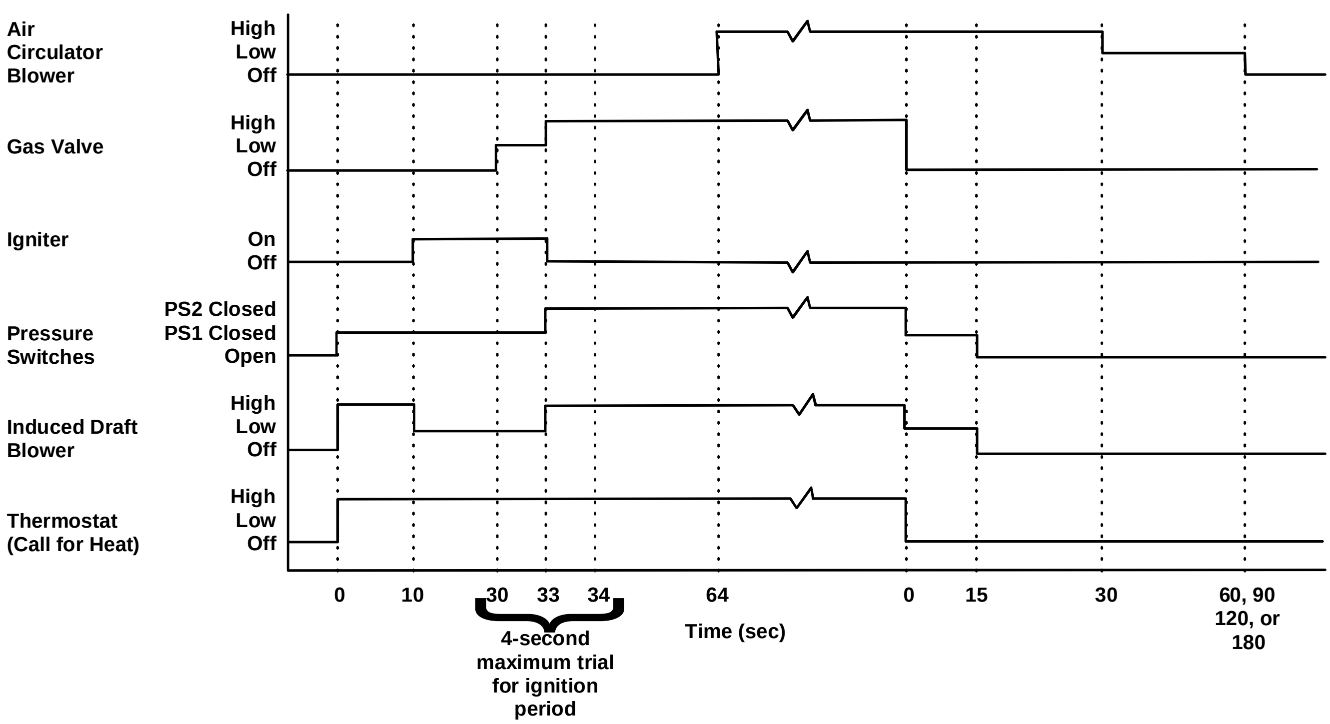
6. Furnace awaits next call from thermostat.

HEATING TIMING CHARTS FOR WHITE-RODGERS 50M61-288 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 1: Continuous Call For Low Stage Heat Only



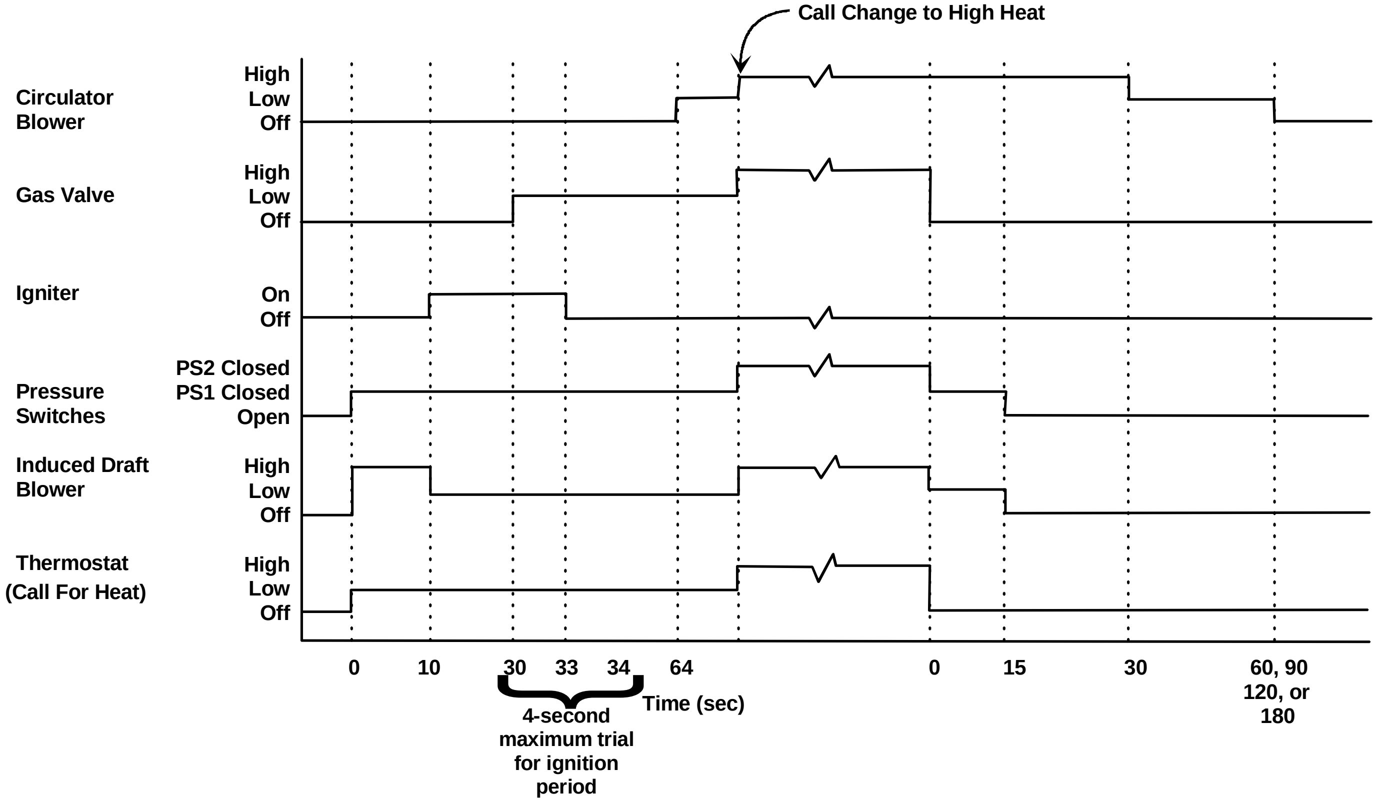
Example 2: Continuous Call For High Stage Heat Only



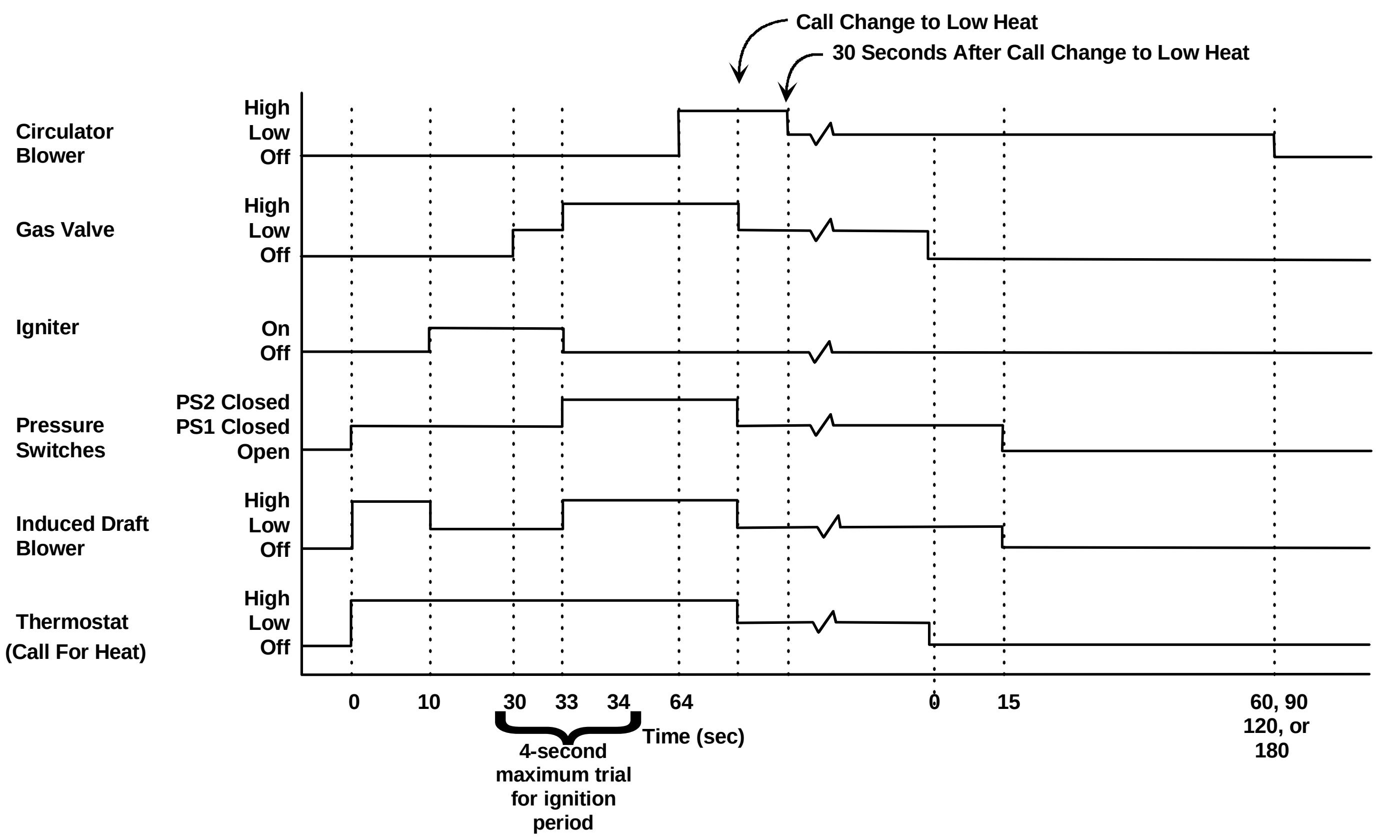
SYSTEM OPERATION

HEATING TIMING CHARTS FOR WHITE-RODGERS 50M61-288 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 3: Initial Call For Low Heat, Change To High Heat

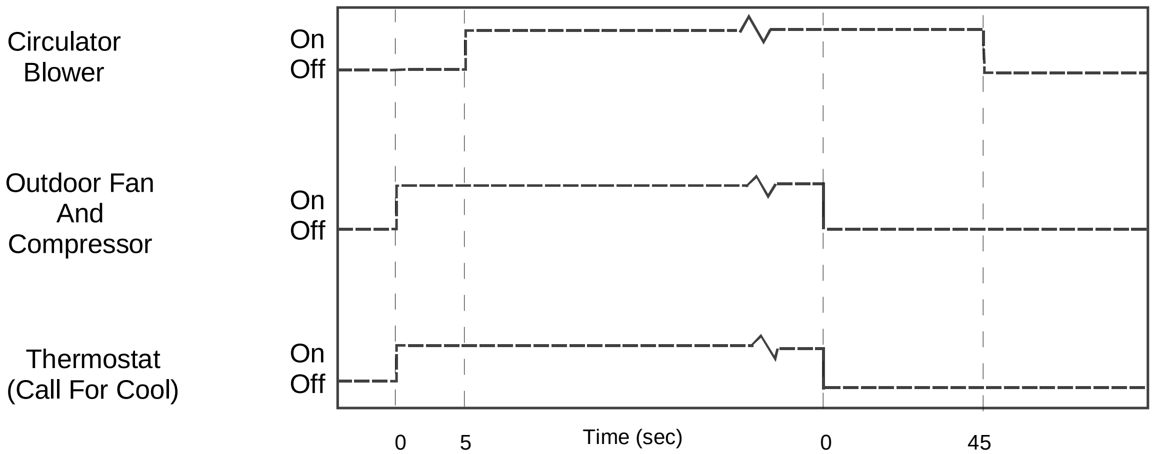


Example 4: Initial Call For High Heat, Subsequent Call To Low Heat

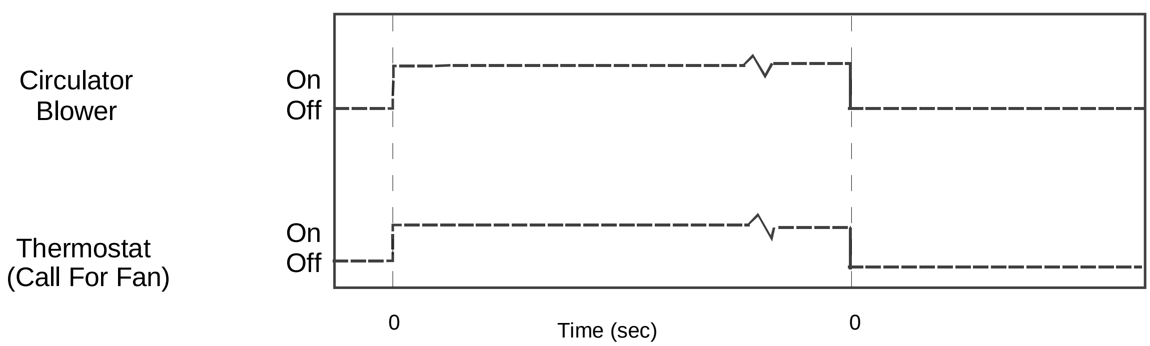


SYSTEM OPERATION

COOLING TIMING CHART FOR WHITE-RODGERS 50M61-288
TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION



TIMING CHART FOR NORMAL FAN OPERATION



SYSTEM OPERATION

Abnormal Operation

(90% Two-Stage Models with White- Rodgers 50M61-288 Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *Troubleshooting Chart* on the following page for an interpretation of the LED signals and to the information in this section for a description of the problem.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes.** The control should be replaced.
2. **System Lockout.** If a flame is not sensed during the first seven (7) seconds after the gas valve is energized, the control turns off the gas. There will then be a 60 second delay while the induced draft blower is energized to purge the heat exchanger. The ignitor will next be energized and preheated for 20 seconds. The gas valve will then be energized. If flame is not sensed in seven (7) seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three (3) times before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after ten (10) seconds, the control will recycle this series of three tries five (5) more times before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

NOTE: The control board will automatically reset one hour after lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected. Refer to *Troubleshooting Chart* on the following pages for aid in determining the cause.

3. **Pressure Switch Stuck Closed.** If the control senses the pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or wiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the pressure switch does not close, the control will keep the induced draft blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable causes are either a blocked, pinched or disconnected hose to the pressure switch, faulty pressure switch or loosse or misconnected wiring, restricted air intake or flue piping, blocked drain system or weak induced draft blower.
5. **Open Primary, Auxiliary or Rollout Limit.** If the limit control opens, the air circulator blower will be turned on until the limit closes. The diagnostic light code for this problem is **four short flashes** followed by a pause. The probable cause for either an open primary or auxiliary limit is low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, blower speed set to low or loose or misconnected wiring. The rollout limit(s) is(are) open due to flame rollout. The probable cause for an open rollout limit is misaligned burners, blocked flue and/or air inlet pipe, failed induced draft blower or loose or misconnected wiring.
6. **Reversed Polarity.** If the 115V or 24V AC power leads are reversed, the furnace will fail to operate. The diagnostic light code for this problem is **six flashes** followed by a pause. The probable cause is either the 115V AC power to furnace or integrated control module is reversed, the 24V AC orange and gray wires to transformer are reversed, or poor unit ground.
7. **Low Flame Sense Signal.** If the furnace continues to operate and the micro-amp signal from the flame sensor falls below specified level. The diagnostic light code for this problem is **seven flashes** followed by a pause. The probable cause is either a coated/oxidized sensor, incorrectly positioned senser in burner flame or lazy burner flame due to improper gas pressure or combustion air.
8. **Ignitor Circuit Problem.** If the furnace fails to operate due to a problem with the ignitor. The diagnostic code for this problem is **eight flashes** followed by a pause. The probable cause is either loose or misconnected wiring or a bad ignitor.
9. **Furnace Operating on Low Stage Gas with High Stage Induced Draft Blower and High Stage Circulator Blower.** If the furnaces high stage pressure switch circuit fails to close in response to high stage induced draft blower operation. The diagnostic light code for this problem is **nine flashes** followed by a pause. The probable causes are either a blocked, pinched or disconnected hose to the pressure switch, faulty pressure switch, loose or misconnected wiring, restricted air intake or flue piping, blocked drain system or weak induced draft blower.
10. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized, it will run the air circulator blower and the induced draft blower continuously with no further furnace operation. The diagnostic flash code for this is a **continuous flash**. The probable causes are either a short to ground in flame sense circuit, miswiring, lingering burner flame or a slow closing gas valve.

SYSTEM OPERATION

NORMAL SEQUENCE OF OPERATION

(90% Two-Stage Variable Speed Models with White-Rodgers 50V61-288 Integrated Ignition Control)

Power Up

The normal power up sequence is as follows:

1. 115 VAC power applied to furnace.
2. Integrated control module performs internal checks.
3. Integrated control module flashes LED one time.
4. Integrated control module monitors safety circuits continuously.
5. Furnace awaits call from thermostat.

Heating Mode

The normal operational sequence in heating mode is as follows:

1. R and W1 (or R and W1 and W2) thermostat contacts close, initiating a call for heat.
2. Integrated control module performs safety circuit checks.
3. Induced draft blower is energized on high speed for a 10-second prepurge. Humidifier terminals are energized with induced draft blower.
4. Induced draft blower steps to low speed following prepurge. Low stage pressure switch contacts are closed.
5. Ignitor warm up (20 seconds) begins upon step to low speed and presence of closed low stage pressure switch contacts.
6. After 20-second ignitor warm up period, low stage gas valve is energized (4-second ignition trial) delivering gas to burners and establishing flame. Ignitor remains on for 3 seconds after gas valve is opened (ignition activation period).
7. Integrated control module monitors flame presence and control begins timing 30-second heat on delay. Gas valve will remain open only if flame is sensed.
8. If the thermostat call is for low heat, gas valve and induced draft blower will continue on low stage. If the call is for high heat, the gas valve and induced draft blower will change to high stage .
9. Circulator blower is energized on the appropriate heat speed following a fixed thirty second blower on delay. The circulator blower requires 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.
10. Furnace is now operating on the specified stage called for by the two-stage thermostat.
11. Furnace runs, integrated control module monitors safety circuits continuously.
12. If the two-stage thermostat changes the call from low heat to high heat, the integrated control module will immediately switch the induced draft blower, gas valve, and circulator blower to their high stage settings.
13. If the two-stage thermostat changes the call from high heat to low heat, the control will immediately switch the induced draft blower and gas valve to their low stage settings. The circulator blower will remain on high heating speed for thirty seconds before switching to the low heat circulating speed.
14. R and W1 (or R and W1 and W2) thermostat contacts open, completing the call for heat.
15. Gas valve closes, extinguishing flame.
16. Induced draft blower is de-energized following a fifteen second post purge. Humidifier terminals are de-energized.
17. Circulator blower continues running for the selected heat off delay period (60, 90, 120, or 180 seconds). The speed run during this period depends on the last heat call provided by the thermostat.

    If the last call for heat was a call for low heat, the air circulator blower will run on low heat speed for the duration of the heat off delay period (60, 90, 120, or 180 seconds).

    If the last call for heat was a call for high heat, the air circulating blower will run on the high heating speed for thirty seconds and then switch to the low heating speed for the **balance** of the heat off delay period (30, 60, 90, or 150 seconds).
18. Circulator blower and electronic air cleaner terminals are de-energized
19. Circulator blower ramps down to OFF during the 30 seconds following the heat off delay period.
20. Furnace awaits next call from thermostat.

SYSTEM OPERATION

Cooling Mode

The normal operational sequence in cooling mode is as follows:

1. R and YLO or Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized to their appropriate speed.
4. Circulator blower is energized on the appropriate cool speed following a fixed five second on delay. The circulator blower requires 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run their appropriate speed, integrated control module monitors safety circuits continuously.
6. R and YLO or Y thermostat contacts open, completing the call for cool.
7. Outdoor fan and compressor are de-energized.
8. Circulator blower continues running for a fixed 45-second cool off delay period. The speed run during this period depends on the last cooling call from the thermostat. If the call was for low cool, the blower will operate at 88% of low cool speed. If call was for high cool, blower operate at 88% of high cool speed.
9. Electronic air cleaner terminals and circulator blower are de-energized.
10. Furnace awaits next call from thermostat.

Fan Only Mode

The normal operational sequence in fan only mode is as follows:

1. R and G thermostat contacts close, initiating a call for fan.
2. Integrated control module performs safety circuit checks.
3. Circulator blower is energized on continuous fan speed (56% of high stage cooling) following a five (5) second delay. Electronic air cleaner terminals are energized.
4. Circulator blower runs, integrated control module monitors safety circuits continuously.
5. R and G thermostat contacts open, completing the call for fan.
6. Circulator blower is de-energized. Electronic air cleaner terminals are de-energized.
7. Furnace awaits next call from thermostat.

NORMAL SEQUENCE OF OPERATION

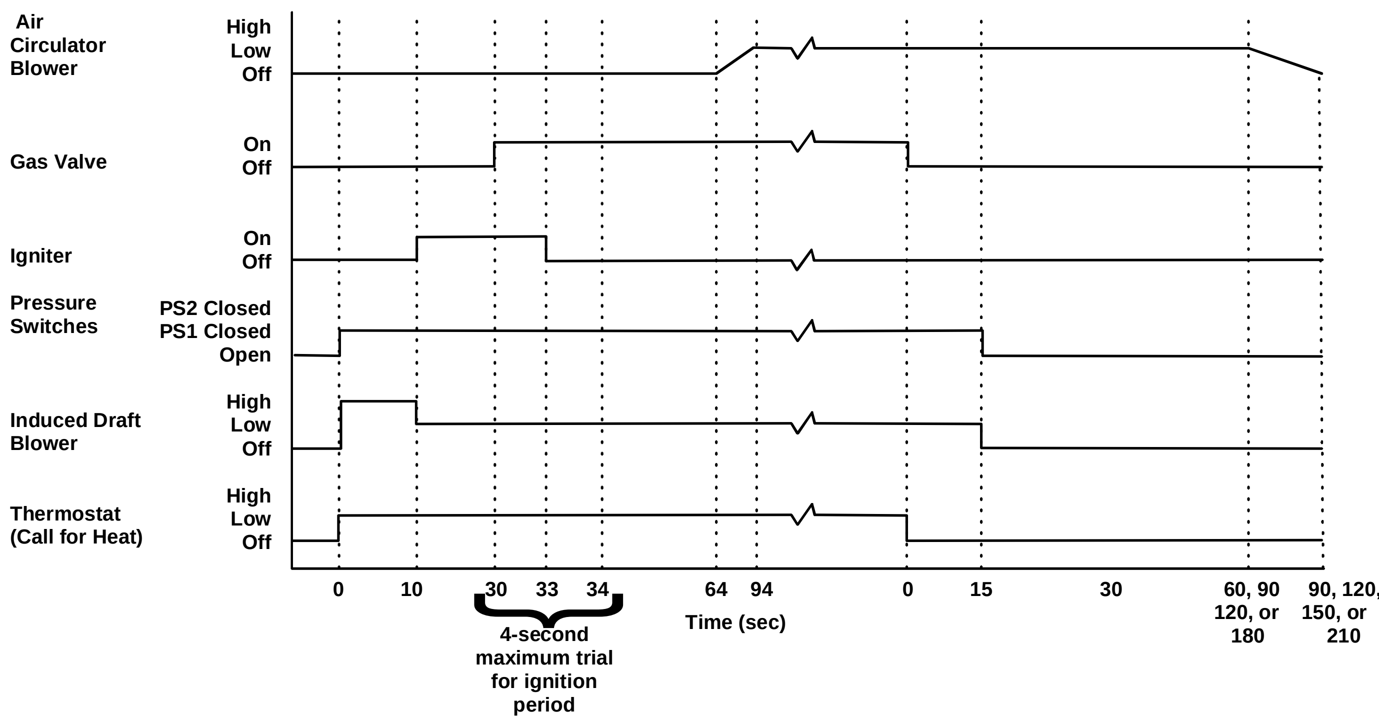
Dehumidification Mode

The normal operational sequence for dehumidification is as follows:

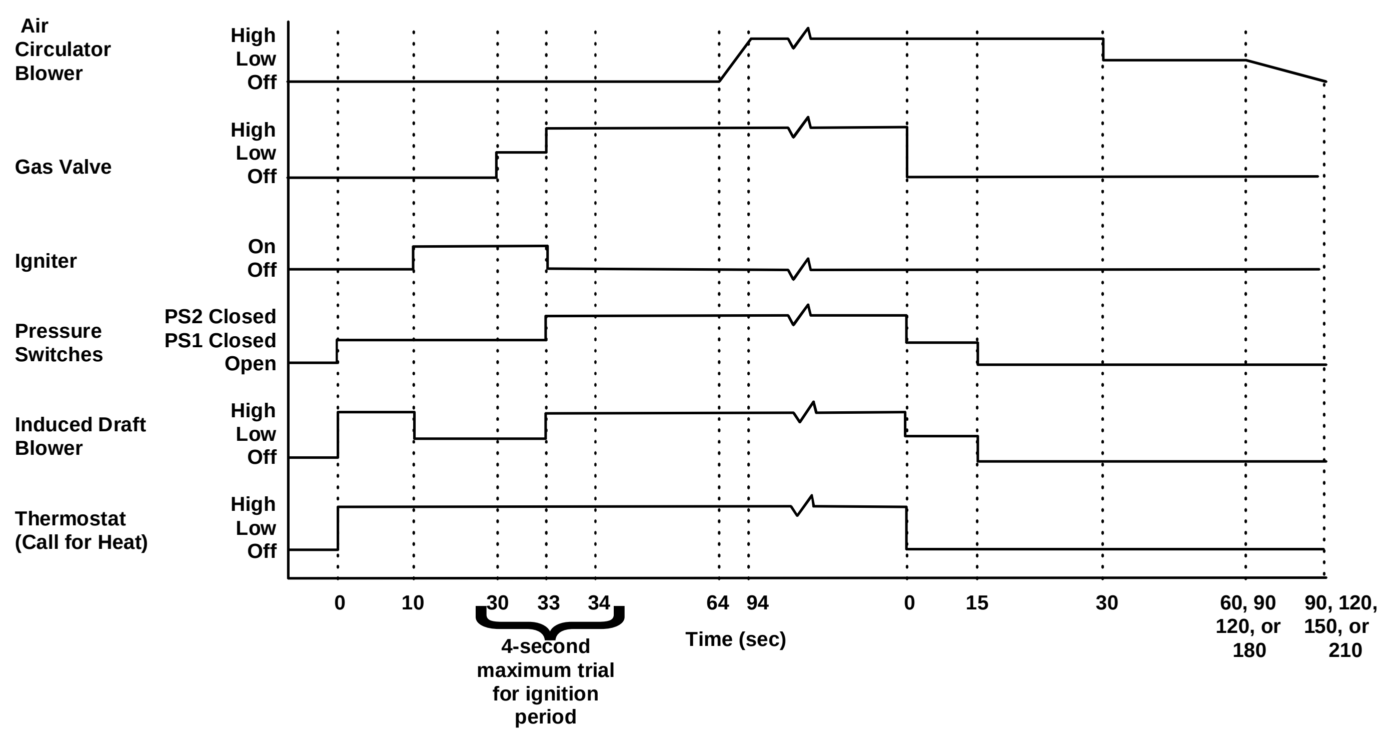
1. R and Y thermostat contacts close, initiating a call for cool.
2. Integrated control module performs safety circuit checks.
3. Outdoor fan and compressor are energized.
4. Circulator blower is energized following a fixed five second on delay. The circulator blower will take 30 seconds to ramp up to full speed. Electronic air cleaner terminals are energized with circulator blower.
5. Furnace circulator blower and outdoor cooling unit run and integrated control module monitors safety circuits continuously.
6. Dehumidistat opens on humidity rise. Motor applies a dehumidification factor of 80% to the cooling airflow demand causing the motor to operate at 80% of cooling airflow demand.
7. When humidity level falls below setting on dehumidistat, the dehumdistat closes allowing the motor to return to set cooling speed.
8. R and Y thermostat contacts open, completing the call for cool.
9. Outdoor fan and compressor are de-energized. Electronic air cleaner terminals are de-energized.
10. Circulator blower is de-energized following a fixed forty five second cool off delay period. The air circulator blower will ramp down for another 30 seconds and shut down.
11. Furnace awaits next call from thermostat.

HEATING TIMING CHARTS FOR WHITE-RODGERS 50V61-288 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 1: Continuous Call For Low Stage Heat Only



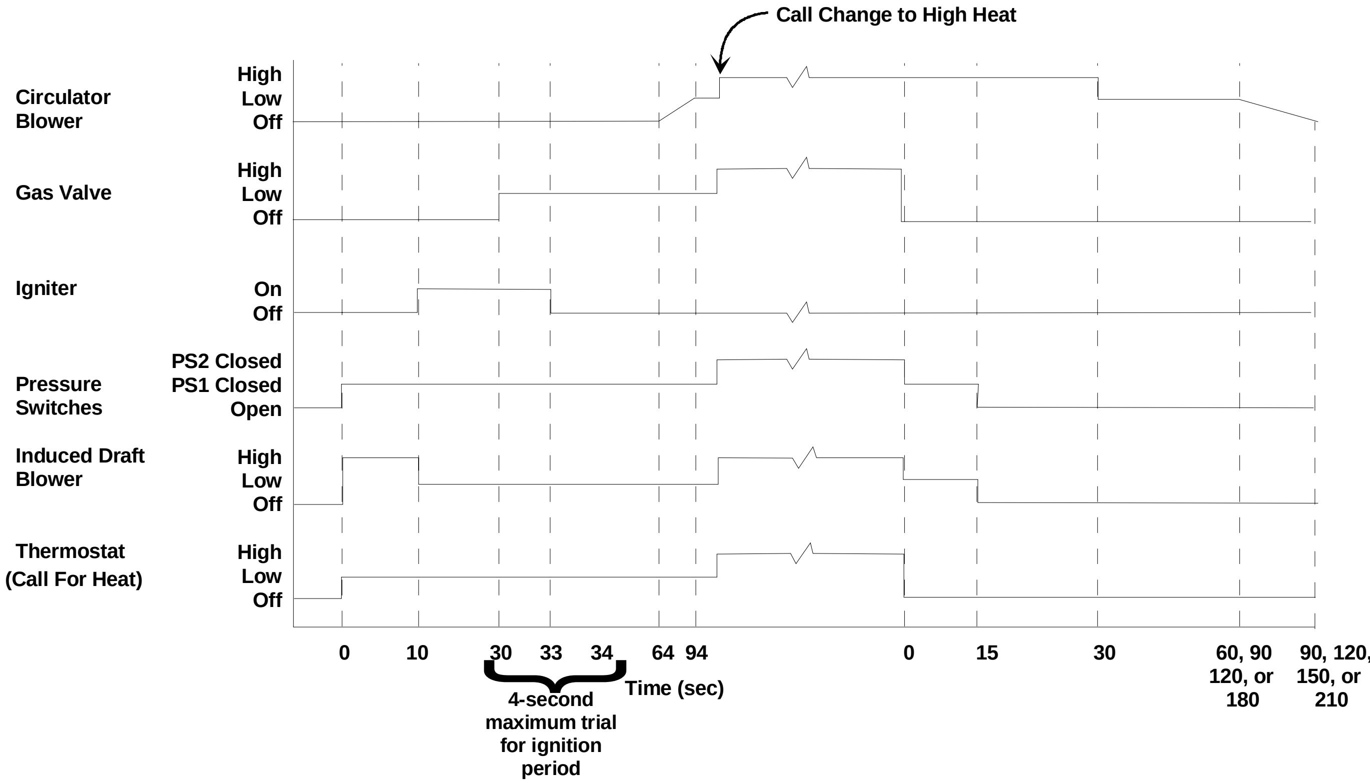
Example 2: Continuous Call For High Stage Heat Only



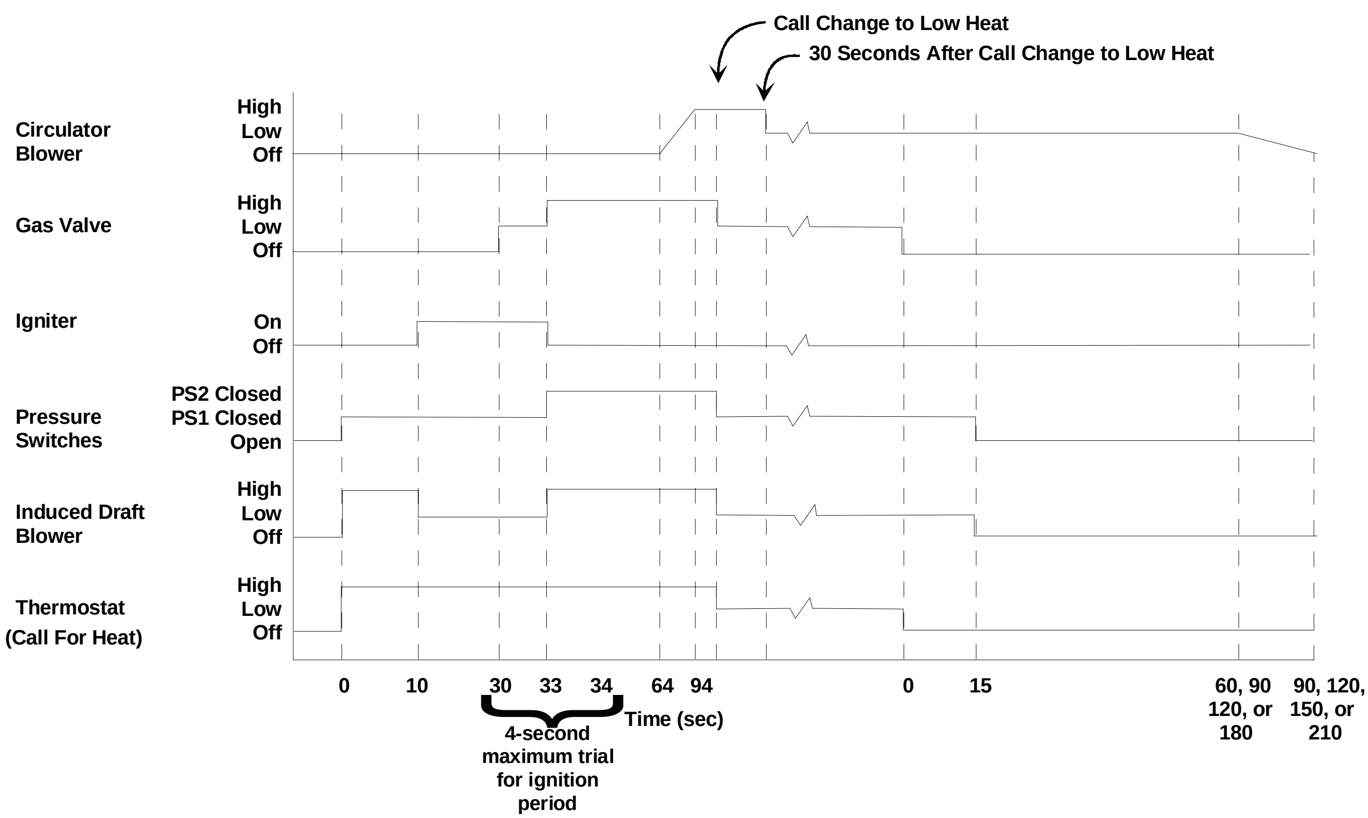
SYSTEM OPERATION

HEATING TIMING CHARTS FOR WHITE-RODGERS 50V61-288 TWO-STAGE INTEGRATED IGNITION CONTROL OPERATION

Example 3: Initial Call For Low Heat, Change In Call To High Heat



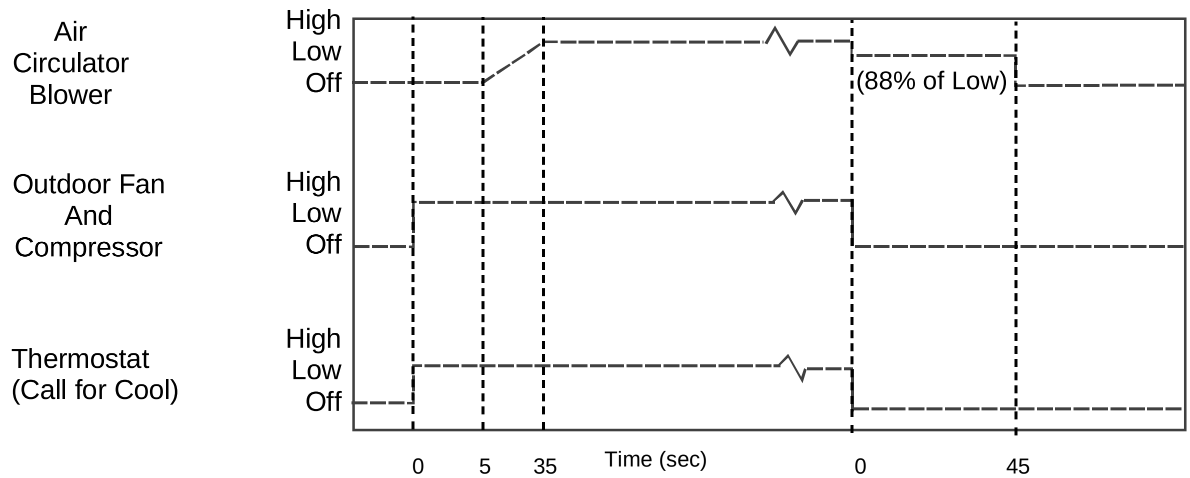
Example 4: Initial Call For High Heat, Subsequent Call To Low Heat



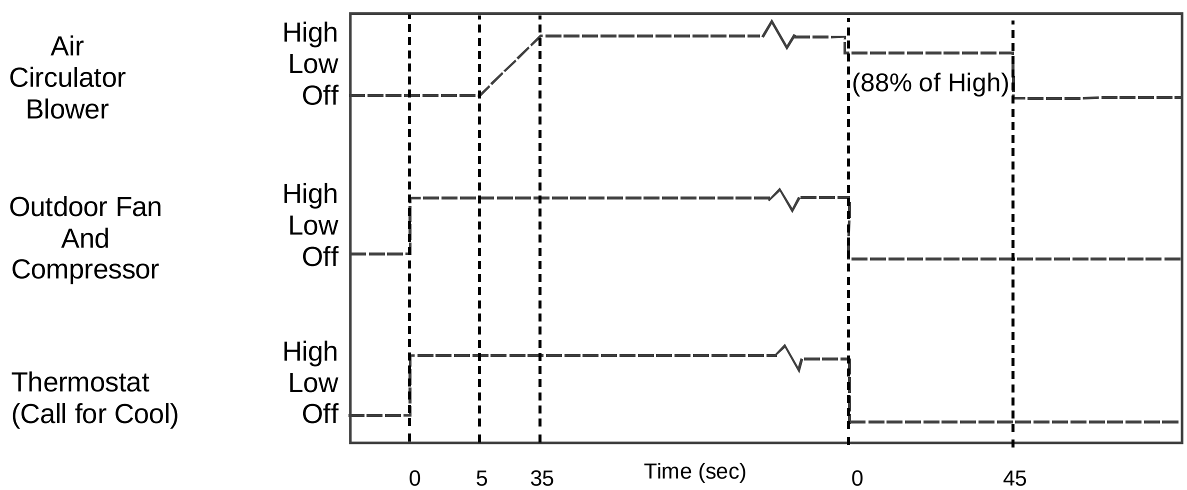
SYSTEM OPERATION

COOLING TIMING CHARTS FOR WHITE-RODGERS 50V61-288 TWO-STAGE VARIABLE SPEED INTEGRATED IGNITION CONTROL OPERATION

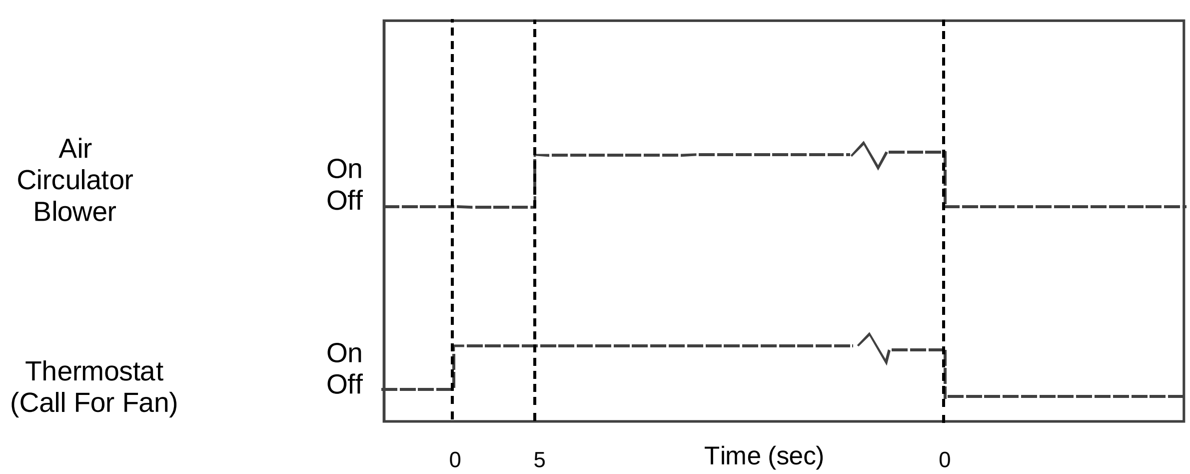
Example 1: Continuous Call for Low Stage Cooling Only



Example 2: Continuous Call For High Stage Cooling Only



CONTINUOUS FAN TIMING CHART FOR WHITE-RODGERS 50V61-288 TWO-STAGE VARIABLE SPEED INTEGRATED IGNITION CONTROL OPERATION



SYSTEM OPERATION

Abnormal Operation

(90% Two-Stage Variable Speed Models with White-Rodgers 50V61-288 Ignition Control)

The following presents the probable causes of questionable furnace operation and how to fix them. Look through the observation window in the blower access door and make a note of the number of flashes in sequence between pauses. Next, refer to the *Troubleshooting Chart* on the following page for an interpretation of the LED signals and to the information in this section for a description of the problem.

1. **Internal Control Failure with Integrated Ignition Control.** If the control determines it has an internal fault, it enters a locked-out state, and the diagnostic light will **light continuously with no flashes.** The control should be replaced.
2. **System Lockout.** If a flame is not sensed during the first four (4) seconds after the gas valve is energized, the control turns off the gas. There will then be a 60 second delay while the induced draft blower is energized to purge the heat exchanger. The ignitor will next be energized and preheated for 20 seconds. The gas valve will then be energized. If flame is not sensed in four (4) seconds the gas valve will be de-energized and another purge will occur. The control will cycle the gas valve a total of three (3) times before it determines it cannot establish measurable combustion and enters a locked out state. If flame is sensed but lost after ten (10) seconds, the control will recycle this series of three tries five (5) more times before locking out. The diagnostic light code for this problem is **one short flash** followed by a longer pause. The control can be reset and brought out of lockout mode by turning the thermostat off and then back on. It can also be reset by turning off the electrical disconnect switch to the furnace for 30 seconds.

NOTE: The control board will automatically reset one hour after lockout occurs. If the furnace frequently has to be reset, it means that a problem exists that should be corrected. Refer to *Troubleshooting Chart* on the following pages for aid in determining the cause.

3. **Pressure Switch Stuck Closed.** If the control senses the pressure switch is closed when the induced draft blower is off, it waits until the fault is corrected. The diagnostic light code for this problem is **two short flashes** followed by a longer pause. The probable cause is either a faulty pressure switch or wiring.
4. **Pressure Switch Stuck Open.** If, after the induced draft blower is energized, the pressure switch does not close, the control will keep the induced draft blower on and wait for the switch to close. The diagnostic light code for this problem is **three short flashes** followed by a pause. The probable causes are either a blocked, pinched or disconnected hose to the pressure switch, faulty pressure switch or loosse or misconnected wiring, restricted air intake or flue piping, blocked drain system or weak induced draft blower.
5. **Open Primary, Auxiliary or Rollout Limit.** If the limit control opens, the air circulator blower will be turned on until the limit closes. The diagnostic light code for this problem is **four short flashes** followed by a pause. The probable cause for either an open primary or auxiliary limit is low conditioned air flow due to dirty filter or resistance in duct work, faulty limit, faulty blower, blower speed set to low or loose or misconnected wiring. The rollout limit(s) is(are) open due to flame rollout. The probable cause for an open rollout limit is misaligned burners, blocked flue and/or air inlet pipe, failed induced draft blower or loose or misconnected wiring.
6. **Reversed Polarity.** If the 115V or 24V AC power leads are reversed, the furnace will fail to operate. The diagnostic light code for this problem is **six flashes** followed by a pause. The probable cause is either the 115V AC power to furnace or integrated control module is reversed, the 24V AC orange and gray wires to transformer are reversed, or poor unit ground.
7. **Low Flame Sense Signal.** If the furnace continues to operate and the micro-amp signal from the flame sensor falls below specified level. The diagnostic light code for this problem is **seven flashes** followed by a pause. The probable cause is either a coated/oxidized sensor, incorrectly positioned senser in burner flame or lazy burner flame due to improper gas pressure or combustion air.
8. **Ignitor Circuit Problem.** If the furnace fails to operate due to a problem with the ignitor. The diagnostic code for this problem is **eight flashes** followed by a pause. The probable cause is either loose or misconnected wiring or a bad ignitor.
9. **Furnace Operating on Low Stage Gas with High Stage Induced Draft Blower and High Stage Circulator Blower.** If the furnaces high stage pressure switch circuit fails to close in response to high stage induced draft blower operation. The diagnostic light code for this problem is **nine flashes** followed by a pause. The probable causes are either a blocked, pinched or disconnected hose to the pressure switch, faulty pressure switch, loose or misconnected wiring, restricted air intake or flue piping, blocked drain system or weak induced draft blower.
10. **Flame Sensed with No Call for Heat.** If the control senses a flame when the gas valve is de-energized, it will run the air circulation blower and the induced draft blower continuously with no further furnace operation. The diagnostic flash code for this is a **continuous flash**. The probable causes are either a short to ground in flame sense circuit, miswiring, lingering burner flame or a slow closing gas valve.

Troubleshooting Chart for 50M61-288 and 50V61-288 Integrated Ignition Controls

Symptoms of Abnormal Operation	Associated RED LED Code (See Note 2)	Fault Descriptions	Possible Causes	Corrective Action	Cautions and Notes
- Furnace fails to operate and - Integrated control module RED diagnostic LED provides no signal.	None	- No 115 V power to furnace, or no 24 V power to integrated control module. - Blown fuse or circuit breaker. - No signal from thermostat.	- Manual disconnect switch OFF, door switch open, or 24 V wires miswired, loose or misconnected. - Blown fuse or circuit breaker. - Improper thermostat connection or setting.	- Assure 115 V and 24 V power to furnace and integrated control module. - Check integrated control module fuse (3 A). Replace if necessary. - Check for possible shorts in 115 V and 24 V circuits. Repair as necessary.	- Turn power OFF prior to repair. - Replace integrated control module fuse with 3 A automotive style fuse.
- Furnace fails to operate and - Integrated control module RED diagnostic LED is lit continuously.	ON Continuous On	- Integrated control module has an internal fault.	- Integrated control module has an internal fault.	- Replace bad integrated control module with known good control module.	- Turn power OFF prior to repair. - Read precautions in "Electrostatic Discharge" section of manual.
- Furnace is not operating and - Integrated control module RED diagnostic LED is flashing one flash.	1 1 Flash	- Furnace lockout due to an excessive number of ignition "retries" (three total attempts) or "recycles" (five total recycles). See Note 1.	- Failure to establish flame Cause may be no gas to burners, front cover pressure switch stuck open, bad igniter or igniter alignment, improper orifices, or coated/oxidized or misconnected flame sensor. - Loss of flame after establishment. Cause may be interrupted gas supply, lazy burner flames (improper gas pressure or restriction in flue and/or combustion air switch, or improper induced draft blower performance.	- Locate and correct gas interruption. - Check front cover pressure switch operation (hose, wiring, contact operation). Correct if necessary. - Replace or realign ignitor. - Check flame sense signal. Sand sensor if coated/oxidized. - Check flue piping for blockage, proper length, elbows, and termination.	- Turn power OFF prior to repair. - Igniter is fragile, handle with care. - Sand flame sensor with steel wool. - See "Flue and Combustion Air Pipe" section for piping details.
- Furnace fails to operate and - Integrated control module RED diagnostic LED is flashing two flashes.	2 2 Flashes	- Pressure switch circuit is closed even though induced draft blower is not operating.	- Induced draft blower pressure switch contacts sticking. - Shorts in pressure switch circuit.	- Replace induced draft blower pressure switch if bad. - Check for and correct shorted wiring.	- Turn power OFF prior to repair. - Replace pressure switch with proper replacement part.
- Induced draft blower cycles ON for one minute and OFF for three minutes with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing three flashes.	3 3 Flashes	- Low stage pressure switch circuit does not close in response to induced draft blower operation.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect low stage pressure switch set point or malfunctioning switch contacts. - Loose or misconnected wiring.	- Check and correct pressure switch hose. - Check flue and/or inlet air piping for blockage, proper length, elbows and termination. Check drain system. - Verify proper low stage pressure switch set point and contact motion. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace pressure switch with proper replacement part.
- Circulator blower runs continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing four flashes.	4 4 Flashes	- Primary limit circuit is open. (Primary or auxiliary limit).	- Insufficient conditioned air over the heat exchanger. Cause may be blocked filters, restrictive ductwork, improper circulator blower speed, or failed circulator blower. - Loose or misconnected wiring.	- Check filters and ductwork for blockage. Clean filters or remove obstruction. - Check for proper circulator blower speed and performance. Correct speed or replace blower if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See Specification Sheet for allowable rise range and proper circulator blower speed.
		- Rollout limit circuit is open.	- Rollout limit(s) is(are) open due to flame rollout. Cause may be misaligned burners, blocked flue and/or air inlet pipe, or failed induced draft blower. - Loose or misconnected wiring.	- Check burners for proper alignment. - Check flue and/or air inlet piping for blockage, proper length, elbows, and termination. - Check induced draft blower for proper performance. Replace if necessary. - Check and correct wiring.	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section for piping details. - Replace induced draft blower with proper replacement part.

Notes:
1) Integrated control module will automatically attempt to reset from lock out after one hour.
2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch.

CHART CONTINUED ON NEXT PAGE

CHART CONTINUED FROM PREVIOUS PAGE.

Troubleshooting Chart for 50M61-288 and 50V61-288 Integrated Ignition Controls

Symptoms of Abnormal Operation	Associated RED LED Code (See Note 2)	Fault Descriptions	Possible Causes	Corrective Action	Cautions and Notes
- Furnace fails to operate. and - Integrated control module RED diagnostic LED is flashing six flashes.	6 Flashes	- Polarity of 115 V power is reversed. - Polarity of 24 V power is reversed.	- Polarity of 115 VAC power to furnace or integrated control module is reversed. - Polarity of 24 V wiring to transformer is reversed. - Poor unit ground.	- Review wiring diagram. - Verify proper grounding. - Check and correct wiring.	- Turn power OFF prior to repair.
- Normal furnace operation. but - Integrated control module RED diagnostic LED is flashing seven flashes.	7 Flashes	- Flame sense micro-amp signal is low.	- Flame sensor is coated/oxidized. - Flame sensor incorrectly positioned in burner flame. - Lazy burner flame due to improper gas pressure, or combustion air.	- Sand flame sensor if coated/oxidized. Inspect for proper sensor alignment. - Check inlet air piping for blockage, proper length, elbows, and termination. - Check for proper gas pressures.	- Turn power OFF prior to repair. - Sand flame sensor with emery cloth. - See "Flue and Combustion Air Pipe" section or piping details. - See rating plate for proper gas pressures.
- Furnace is not operating. and - Integrated control module RED diagnostic LED is flashing eight flashes.	8 Flashes	- Problem with igniter circuit.	- Misconnected igniter. - Bad igniter. - Poor unit ground.	- Check and correct wiring from integrated control module to igniter. - Replace bad igniter. - Check and correct wiring.	- Turn power OFF prior to repair. - Replace igniter with proper silicon nitride replacement part.
- Furnace operating on low stage gas with high stage induced draft blower and high stage circulator blower (temperature, of conditioned air, lower than typical) and - Integrated control module RED diagnostic LED is flashing nine flashes.	9 Flashes	- High stage pressure switch circuit does not close in response to high stage induced draft blower operation.	- Pressure switch hose blocked, pinched, or misconnected. - Blocked flue and/or inlet air pipe, blocked drain system, or weak induced draft blower. - Incorrect high stage pressure switch set point or malfunctioning switch contacts. - Lo	- Check and correct pressure switch hose. - Check flue and/or inlet piping for blockage, proper length, elbows, and termination. Check drain system. - Verify proper high stage pressure switch set point and contact motion. - Check and correc	- Turn power OFF prior to repair. - See "Flue and Combustion Air Pipe" section or piping details. - Replace pressure switch with proper replacement part.
- Induced draft and circulator blower run continuously with no further furnace operation. and - Integrated control module RED diagnostic LED is flashing continuously.	Continuous Flashing	- Flame has been sensed with no call for heat.	- Short to ground in flame sense circuit. - Lingering burner flame. - Slow closing gas valve.	- Correct short at flame sensor or in flame sensor wiring. - Check for lingering flame. - Verify proper operation of gas valve.	- Turn power OFF prior to repair.

NOTES:

1) Integrated control module will automatically attempt to reset from lock out after one hour.

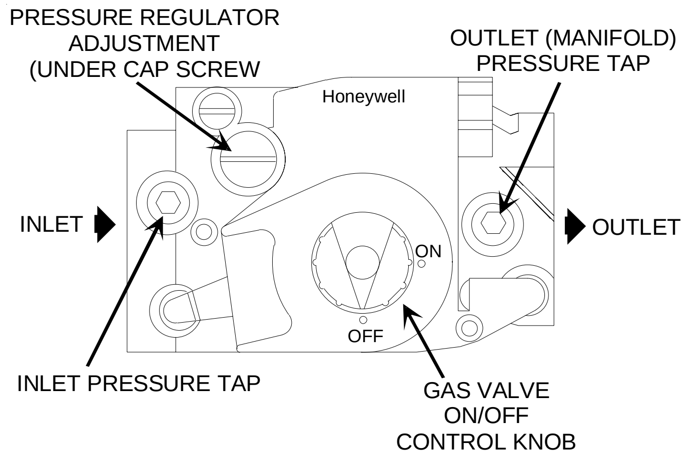
2) LED flash code will cease if power to the control module is interrupted through the disconnect or door switch

SYSTEM OPERATION

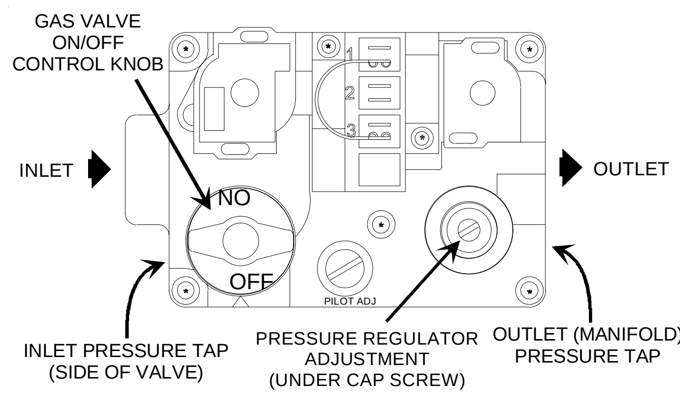
OPERATING INSTRUCTIONS

1. Close the manual gas valve external to the furnace.
2. Turn off the electrical power supply to the furnace.
3. Set room thermostat to lowest possible setting.
4. Remove the door on the front of the furnace.
5. This furnace is equipped with an ignition device which automatically lights the burner. Do not try to light burner by hand.
6. Turn the gas control valve clockwise to the "Off" position for either the Honeywell VR-8205 gas valve or the White Rodgers 36E35,36E36 and 36E96 gas valves. The knob should turn easily. Do not use excessive force. For the Robertshaw 7222 gas valve, push in and slide the valve lever on the left and side of the valve to the "Off" position and for the White Rodgers 36E22, 36F22, 36G22 and 36E54 gas valve slide the switch on top of the valve to the "Off" position. Do not force.
7. Wait five (5) minutes to clear out any gas, then smell for gas, including near the floor.
8. If you smell gas following the five (5) minute waiting period in Step 7, follow the instructions on Pages 20 through 25. If you do not smell gas, then turn the gas control knob counterclockwise to the "On" position for either the Honeywell VR-8205 gas valve or the White Rodgers 36E35, 36E36 and 36E96 gas valves. The knob should turn easily. Do not use excessive force. For the Robertshaw 7222 gas valve push in and slide the valve lever on the lefthand side of the valve to the "On" position and for the White Rodgers 36E22, 36E54, 36F22 and 36G22 gas valve push the selector switch on top of the valve to the "On" position.
9. Replace the door on the front of the furnace.
10. Open the manual gas valve external to the furnace.
11. Turn on the electrical power supply to the furnace.
12. Set the room thermostat to the desired temperature.

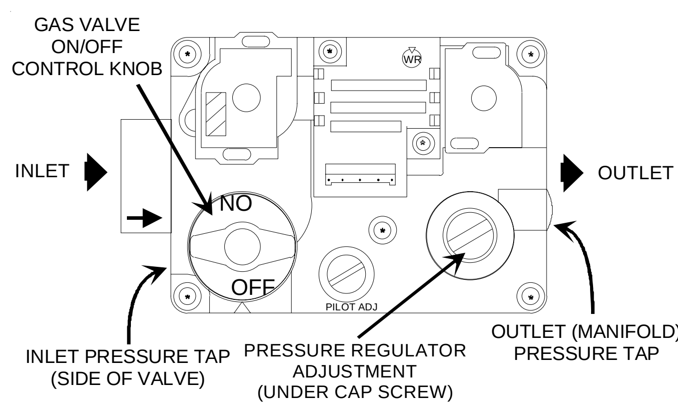
NOTE: There is approximately 20 second delay between thermostat energizing and burner firing.



Honeywell Model: VR-8205
GUIA,GCIA / GUIC,GCIC

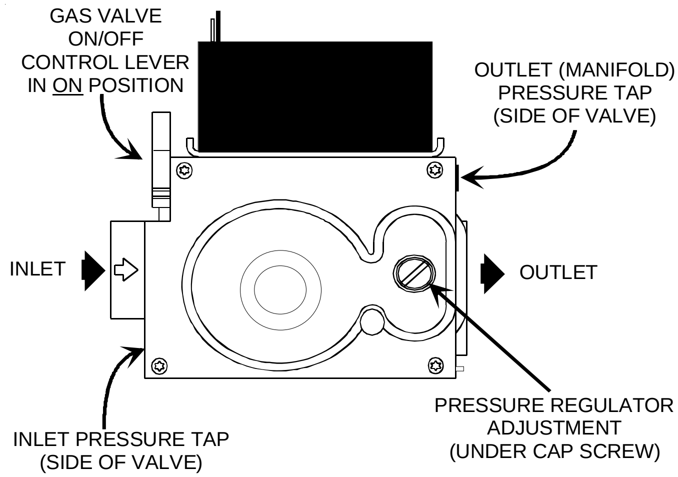


White-Rodgers Model: 36E36 Type 230
GUIA,GCIA / GUIC,GCIC

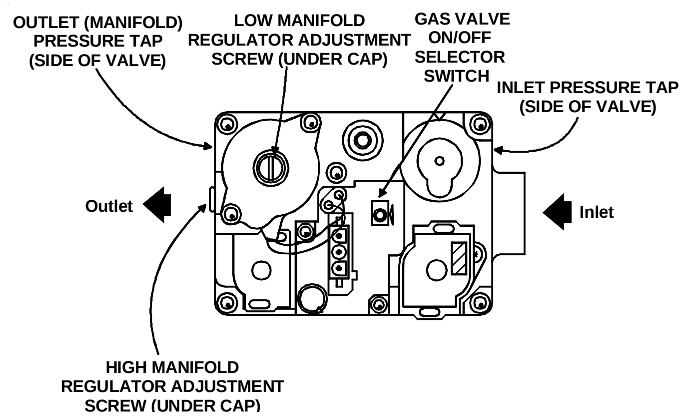


White-Rodgers Model: 36E35 Type 205
GUIB / GCIB

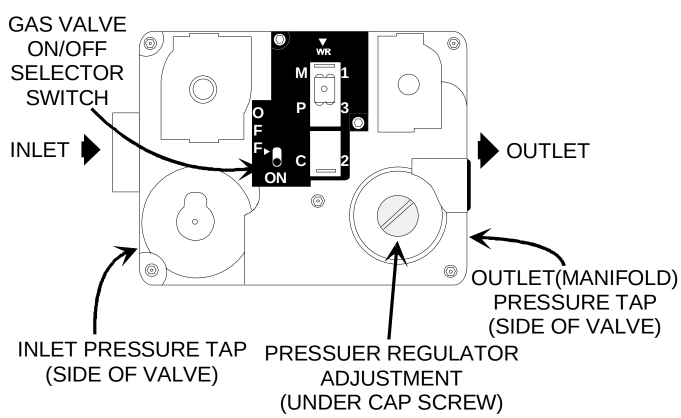
SYSTEM OPERATION



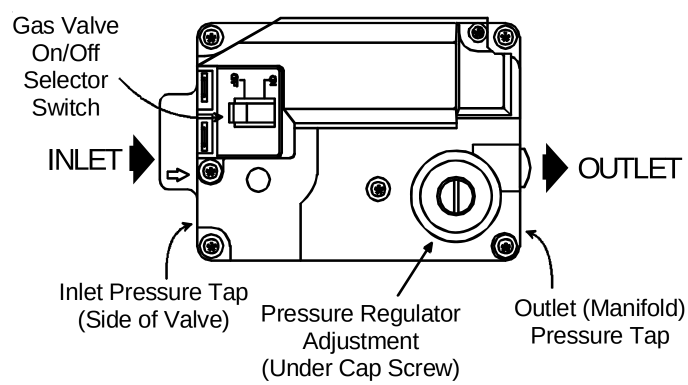
Robertshaw Model: 7222
GUID



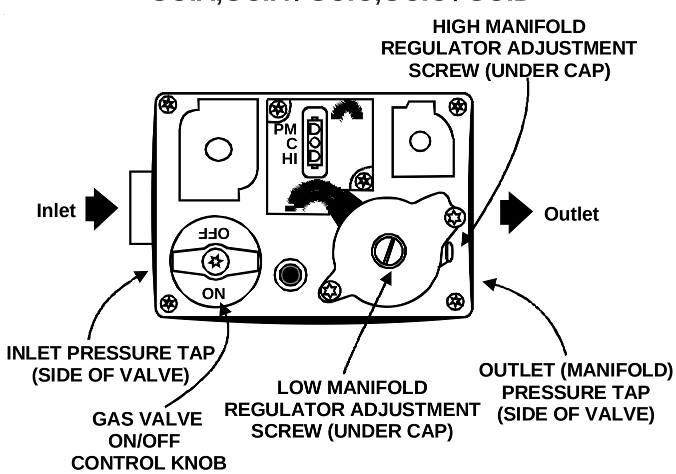
White-Rodgers Model: 36E54
GUIS / GCIS / GUIV / GUSA / GCVA / GUVA



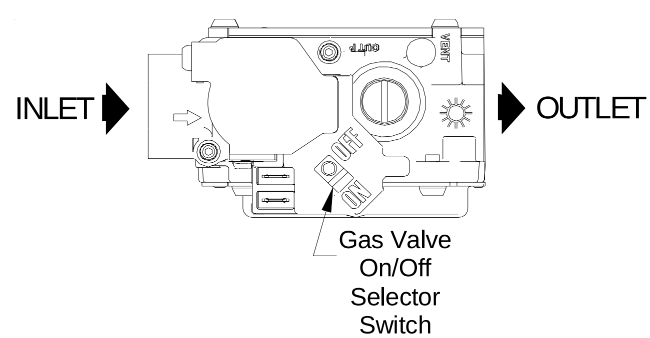
White-Rodgers Model: 36E22
GUIA,GCIA / GUIC,GCIC / GUID



White-Rodgers Model: 36F22
GUIE*EX



White-Rodgers Model: 36E96
GUIS / GCIS / GUIV



White-Rodgers Model: 36G22
GULA / GCLA

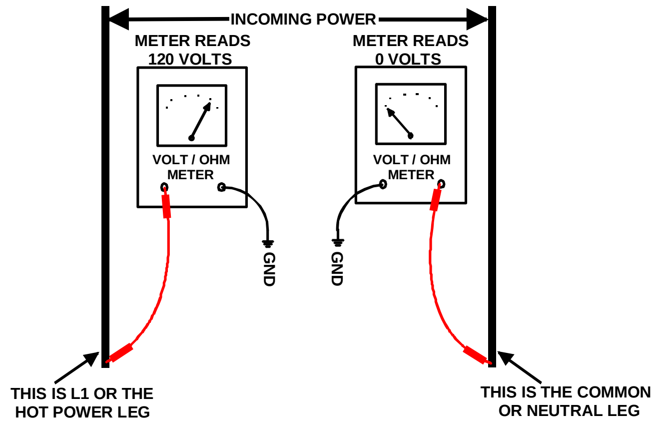
POLARIZATION AND PHASING

As more and more electronic's are introduced to the Heating Trade, Polarization of incoming power and phasing of primary to secondary voltage on transformers becomes more important.

Polarization has been apparent in the Appliance industry since the introduction of the three prong plug, however, the Heating Industry does not use a plug for incoming power, but is hard wired.

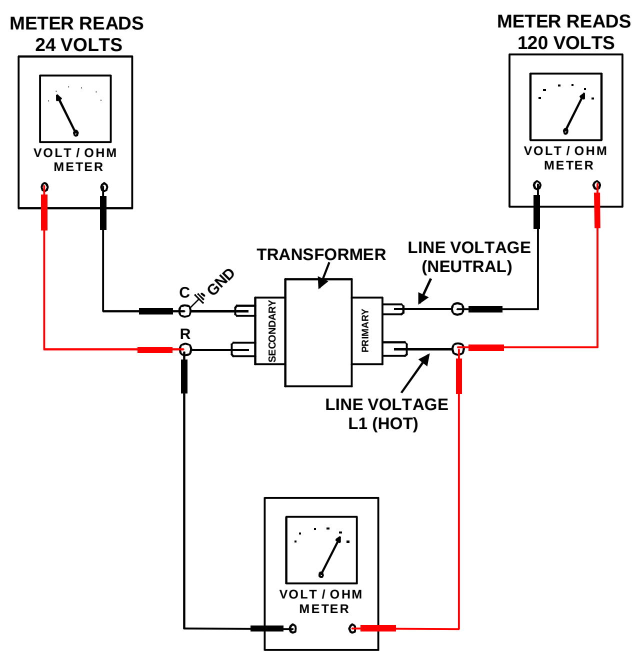
Some of the electronic boards being used today, with flame rectification, will not function properly and/or at all without polarization of incoming power. Some also require phasing between the primary and secondary sides of step-down transformers.

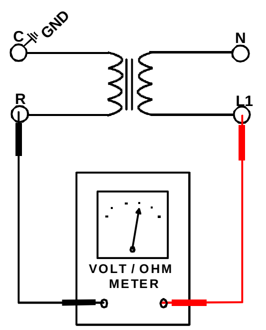
To instill new working habits for our trade, we recommend that these two items be checked during normal installation and/or service calls. See as follows:



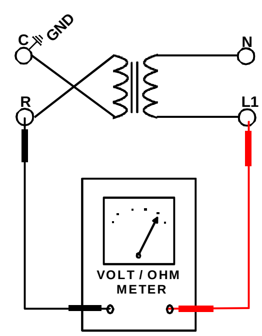
These then should be wired to the furnace accordingly.

CHECKING FOR PHASING - PRIMARY TO SECONDARY OF UNMARKED TRANSFORMERS*





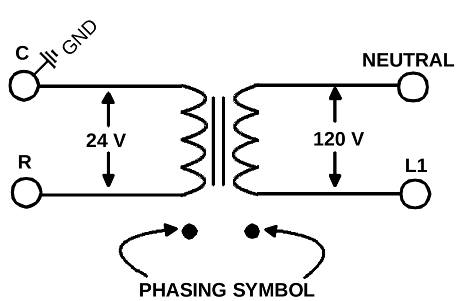
READS 96 VOLTS - IN PHASE



READS 144 VOLTS - OUT OF PHASE

If meter reads approximately 96 volts - the primary to secondary are in phase - if reads approximately 144 volts out of phase - reverse low voltage wires.

***NOTE:** For flame rectification the common side of the secondary voltage (24 V) is cabinet grounded. If you were to bench test a transformer the primary neutral and secondary common must be connected together for testing purposes.



Some transformers will display phasing symbols as shown in the illustration to the left to assist in determining proper transformer phasing.

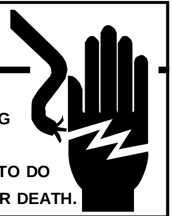
Checking for polarization and phasing should become a habit in servicing. Let's start now.

NOTE: Newer integrated ignition controls have a diagnostic flash code for reversed polarity (Refer to *Troubleshooting-Diagnostic Chart* for LED Codes).

MAINTENANCE

⚠ WARNING

HIGH VOLTAGE
Disconnect ALL power before servicing, removing the filter, or performing any other maintenance. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.



⚠ CAUTION

If you must handle the ignitor, handle with care. Touching the ignitor body with bare fingers, rough handling, or vibration could result in early ignitor failure. Only a qualified servicer should ever handle the ignitor.

ANNUAL INSPECTION

The furnace should be inspected by a qualified installer, or service agency at least once per year. This check should be performed at the beginning of the heating season. This will ensure that all furnace components are in proper working order and that the heating system functions appropriately. Pay particular attention to the following items. Repair or service as necessary.

- Flue pipe system. Check for blockage and/or leakage. Check the outside termination and the connections at and internal to the furnace.
- Combustion air intake pipe system (where applicable). Check for blockage and/or leakage. Check the outside termination and the connection at the furnace.
- Heat exchanger. Check for corrosion and/or buildup within the heat exchanger passageways.
- Burners. Check for proper ignition, burner flame, and flame sense.
- Drainage system. Check for blockage and/or leakage. Check hose connections at and internal to furnace.
- Wiring. Check electrical connections for tightness and/or corrosion. Check wires for damage.
- Filters.

AIR FILTER

⚠ WARNING

Never operate furnace wihtout a filter installed as dust and lint will build up on internal parts resulting in loss of efficiency, equipment damamge, and possible fire.

Filters must be used with this furnace. Filters do not ship with these furnaces but must be provided by the installer for proper furnace operation.

Remember that dirty filters are the most common cause of inadequate heating or cooling performance.

⚠ WARNING

Disconnect ALL power before servicing.

Maintenance

Improper filter maintenance is the most common cause of inadequate heating or cooling performance. Filters should be cleaned (permanent) or replaced (disposable) every two months or as required. It is the owner's responsibility to keep air filters clean. When replacing a filter, it must be replaced with a filter of the same type and size.

Filter Removal

Depending on the installation, differing filter arrangements can be applied. Filters can be installed in the central return register, the bottom of the blower compartment (upflow only), a side panel external filter rack kit (upflow only), or the ductwork above a counterflow furnace. A media air filter or electronic air cleaner can be used as an alternate filter. The filter sizes given in the *Product Design* section of this manual or the product *Specification Sheet* must be followed to ensure proper unit performance. Refer to the following information for removal and installation of filters.

Upright *Upflow* Filter Removal

To remove an internal filter from the bottom of the blower compartment:

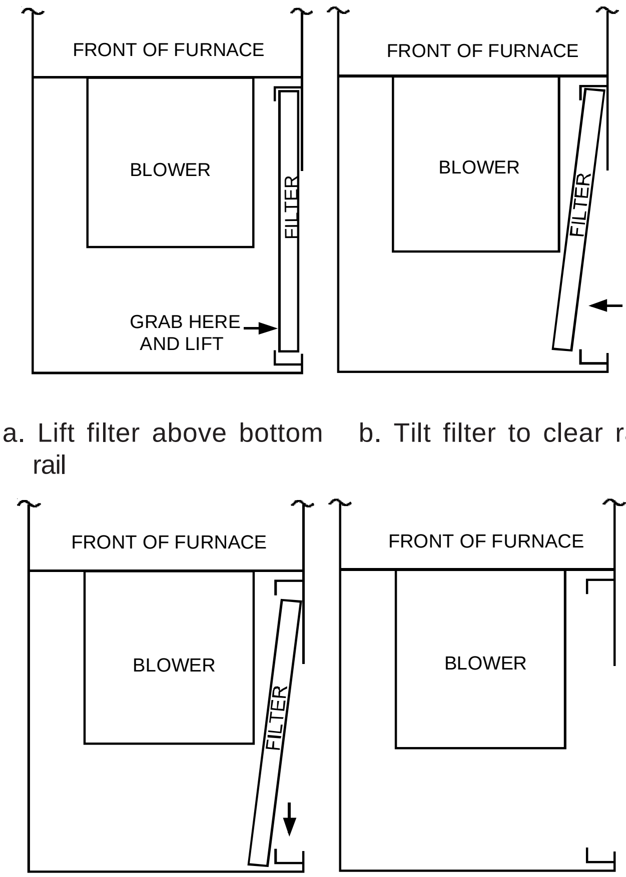
1. Set the thermostat to the OFF position or turn OFF electrical power to furnace.
2. Remove blower compartment door.
3. Push back and up on the wire filter retainer to release it from under the front lip of the furnace basepan. Do not remove. To access the filter, tilt the wire filter retainer upwards.
4. Slide filter forward and out. Vacuum blower compartment.
5. Replace filter and secure retainer opposite of removal.
6. Replace blower compartment door and turn ON thermostat or electrical power to furnace.

To remove filters from an external filter rack in an upright upflow installation, follow the directions provided with external filter rack kit.

To remove internal filter(s) from the retaining rails on the side(s) of the blower compartment in an upright installation:

1. Set the thermostat to the OFF position or turn OFF electrical power to furnace.
2. Remove the blower compartment door.
3. Grasping the lower portion of the filter, disengage the filter from the lower railing by lifting it up and toward the blower. Lower the filter down and pull outward.

4. Replace filter and blower compartment door opposite of removal and turn ON thermostat or electrical power.



a. Lift filter above bottom rail

b. Tilt filter to clear rail.

c. Lower filter below top rail.

d. Slide filter out.

Filter Removal Procedure

Media Air Filter or Electronic Air Cleaner Removal
Follow the manufacturer's directions for service.

Upright* Counterflow *Filter Removal
To remove filters from the ductwork above an upright counterflow installation:

1. Turn off electrical power to furnace.
2. Remove access door in ductwork above furnace.
3. Remove filters
4. Remove blower compartment door. Vacuum compartment. Replace blower compartment door.
5. Replace filters opposite of removal.
6. Replace access door in ductwork.

Horizontal Unit Filter Removal
Filters in horizontal installations are located in the central return register.

INDUCED DRAFT AND CIRCULATION BLOWERS
The bearings in the induced draft blower and circulator blower motors are permanently lubricated by the manufacturer. No further lubrication is required. Check motor windings for accumulation of dust which may cause overheating. Clean as necessary.

CONDENSATE DRAINAGE SYSTEM (QUALIFIED SERVICER ONLY)
The drain tubes, standpipe, and field supplied drain line must be checked annually and cleaned as often as necessary to ensure proper condensate drainage.

FLUE PASSAGES (QUALIFIED SERVICER ONLY)

At the start of each heating season, inspect and, if necessary, clean the furnace flue passages.

CLEANING FLUE PASSAGES (QUALIFIED SERVICER ONLY)

1. Turn OFF the electrical power and gas supply to the furnace.
2. Disconnect the gas line and remove the burner/ manifold assembly by removing the screws securing the assembly to the partition panel.
3. Disconnect the flue pipe system from the induced draft blower.
4. Remove the induced draft blower and, drain and pressure tap hoses from the recuperator coil front cover.
5. Remove the recuperator coil front cover to expose the coil tubes and turbulators.
6. Remove the recuperator coil turbulators individually by slowly pulling each turbulator forward firmly.
7. Clean the recuperator coil tubes using a long handle wire brush, such as a gun cleaning brush.
8. Clean the primary heat exchanger tubes using a wire brush attached to a length of high grade stainless steel cable, such as drain cleanout cable. Attach a variable speed reversible drill to the other end of the cable. Slowly rotate the cable with the drill and insert it into one of the heat exchanger tubes. While reversing the drill, work the cable in and out several times to obtain sufficient cleaning. Repeat for each tube.

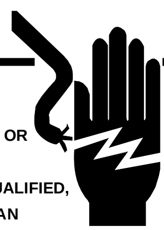
9. Clean residue from furnace using a vacuum cleaner.
10. Replace the parts removed in the previous steps in reverse order.
11. Turn on electrical power and gas to furnace. Check for leaks and proper unit operation.
12. Severe heat exchanger fouling is an indication of an operational problem. Perform the steps listed in the *System Operation* section of this manual to reduce the chances of repeated fouling.

FLAME SENSOR (QUALIFIED SERVICER ONLY)

Under some conditions, the fuel or air supply can create a nearly invisible coating on the flame sensor. This coating acts as an insulator, causing a drop in the flame sensing signal. If this occurs, a qualified servicer must carefully clean the flame sensor with steel wool. After cleaning, the flame sensor output should be as listed on the specification sheet.

BURNERS

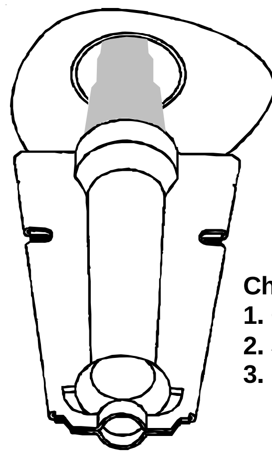
WARNING



HIGH VOLTAGE

ELECTRICAL COMPONENTS ARE CONTAINED IN BOTH COMPARTMENTS. TO AVOID ELECTRICAL SHOCK, INJURY OR DEATH, DO NOT REMOVE ANY INTERNAL COMPARTMENT COVERS OR ATTEMPT ANY ADJUSTMENT. CONTACT A QUALIFIED, PROFESSIONALLY TRAINED SERVICE AGENT AT ONCE IF AN ABNORMAL FLAME APPEARANCE SHOULD DEVELOP.

Periodically during the heating season make a visual check of the burner flames. Turn the furnace on at the thermostat. Wait a few minutes, since any dislodged dust will alter the normal flames appearance. Flames should be stable, quiet, soft and blue with slightly orange tips. They should not be yellow. They should extend directly outward from the burner ports without curling downward, floating or lifting off the ports.



Check the burner flames for:
1. Good adjustment
2. Stable, soft and blue
3. Not curling, floating, or lifting off.

Burner Flame

TEST EQUIPMENT

Proper test equipment for accurate diagnosis is as essential as regulator hand tools.

The following is a must for every service technician and service shop.

1. Dial type thermometers or thermocouple meter (optional) - to measure dry bulb temperature.
2. Amprobe - to measure amperage and voltage.
3. Volt-Ohm Meter - testing continuity, capacitors, and motor windings.
4. Inclined Manometer - to measure static pressure, pressure drop across coils, filters, and draft.
5. Water Manometer (12") - to test gas inlet and manifold pressure.

Other recording type instruments can be essential in solving abnormal problems, however, in many instances they may be rented from local sources.

Proper equipment promotes faster, more efficient service and accurate repairs resulting in fewer call backs.

HEATING PERFORMANCE TEST

Before attempting to diagnose an operating fault, run a heating performance test and apply the results to the *Service Problem Analysis Guide.*

To conduct a heating performance test, the BTU input to the furnace must be calculated.

After the heating cycle has been in operation for at least fifteen minutes and with all other gas appliances turned off, the gas meter should be clocked.

To find the BTU input, multiply the number of cubic feet of gas consumed per hour by the heating value of the gas being used. (The calorific value of the gas being used is found by contacting your local utility.)

EXAMPLE: It is found by the gas meter, that it takes forty (40) seconds for the hand on the cubic foot dial to make one complete revolution, with all appliances off, except the furnace. Take this information and locate it on the gas rate chart. Observe the forty (40) seconds, locate and read across to the one (1) cubic foot dial column. There we find the number 90, which shows that ninety (90) cubic feet of gas will be consumed in one (1) hour.

Let's assume the local gas utility has stated that the calorific value of the gas is 1025 BTU per cubic foot.

Multiplying the ninety (90) cubic feet per hour by 1025 BTU per cubic foot gives us an input of 92,250 BTUH.

Check the BTU input on the rating plate of the furnace being tested.

EXAMPLE: GUCA090AX40

INPUT: 92,000 BTU/HR

OUTPUT CAP: 84,000

Should the figure you calculated not fall within five (5) percent of the nameplate rating of the unit, adjust the gas valve pressure regulator or resize orifices.

CAUTION

ALWAYS CONNECT A MANOMETER TO THE OUTLET TAP AT THE GAS VALVE BEFORE ADJUSTING THE PRESSURE REGULATOR. IN NO CASE SHOULD THE FINAL MANIFOLD PRESSURE VARY MORE THAN PLUS OR MINUS .3 INCHES WATER COLUMN FROM 3.5 INCHES WATER COLUMN FOR NATURAL GAS OR 10 INCHES WATER COLUMN FOR PROPANE GAS.

To adjust the pressure regulator on the gas valve, turn down (clockwise) to increase pressure and input, and out (counterclockwise) to decrease pressure and input.

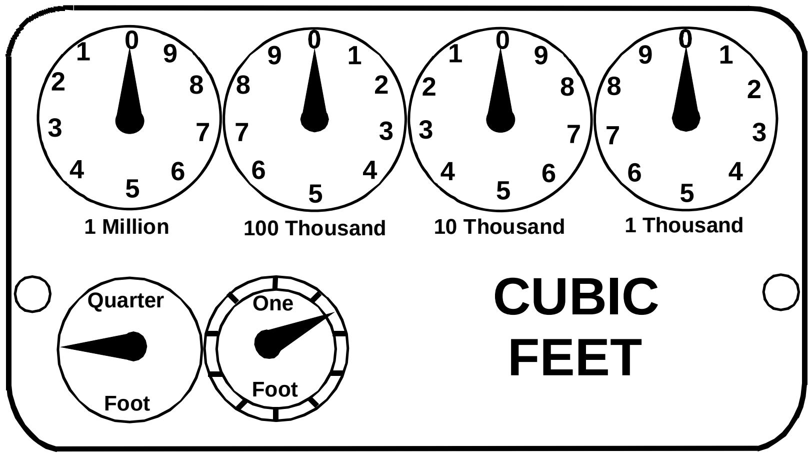
Since normally propane gas is not installed with a gas meter, clocking will be virtually impossible. The gas orifices used with propane are calculated for 2500 BTU per cubic foot gas and with proper inlet pressures and correct piping size, full capacity will be obtained.

With propane gas, no unit gas valve regulator is used; however, the second stage supply line pressure regulator should be adjusted to give 11" water column with all other gas consuming appliances running.

The dissipation of the heat transferred to the heat exchanger is now controlled by the amount of air circulated over its surface.

The amount (CFM) of air circulated is governed by the external static pressure in inches of water column of duct work, cooling coil, registers and etc., applied externally to the unit versus the motor speed tap (direct drive) or pulley adjustments of the motor and blower (belt drive).

A properly operating unit must have the BTU input and CFM of air, within the limits shown to prevent short cycling of the equipment. As the external static pressure goes up, the temperature rise will also increase. Consult the proper tables for temperature rise limitation.



GAS RATE -- CUBIC FEET PER HOUR											
Seconds for One Revolution	Size of Test Dial					Seconds for One Revolution	Size of Test Dial				
	1/4 cu/ft	1/2 cu/ft	1 cu/ft	2 cu/ft	5 cu/ft		1/4 cu/ft	1/2 cu/ft	1 cu/ft	2 cu/ft	5 cu/ft
10	90	180	360	720	1800	36	25	50	100	200	500
11	82	164	327	655	1636	37	--	--	97	195	486
12	75	150	300	600	1500	38	23	47	95	189	474
13	69	138	277	555	1385	39	--	--	92	185	462
14	64	129	257	514	1286	40	22	45	90	180	450
15	60	120	240	480	1200	41	--	--	--	176	439
16	56	113	225	450	1125	42	21	43	86	172	429
17	53	106	212	424	1059	43	--	--	--	167	419
18	50	100	200	400	1000	44	--	41	82	164	409
19	47	95	189	379	947	45	20	40	80	160	400
20	45	90	180	360	900	46	--	--	78	157	391
21	43	86	171	343	857	47	19	38	76	153	383
22	41	82	164	327	818	48	--	--	75	150	375
23	39	78	157	313	783	49	--	--	--	147	367
24	37	75	150	300	750	50	18	36	72	144	360
25	36	72	144	288	720	51	--	--	--	141	355
26	34	69	138	277	692	52	--	--	69	138	346
27	33	67	133	265	667	53	17	34	--	136	340
28	32	64	129	257	643	54	--	--	67	133	333
29	31	62	124	248	621	55	--	--	--	131	327
30	30	60	120	240	600	56	16	32	64	129	321
31	--	--	116	232	581	57	--	--	--	126	316
32	28	56	113	225	563	58	--	31	62	124	310
33	--	--	109	218	545	59	--	--	--	122	305
34	26	53	106	212	529	60	15	30	60	120	300
35	--	--	103	206	514						

Complaint	No Heat			Unsatisfactory Heat						Test Method Remedy	See Service Procedure Reference
POSSIBLE CAUSE DOTS IN ANALYSIS GUIDE INDICATE "POSSIBLE CAUSE" / SYMPTOM	System Will Not Start	Burner Won't Ignite	Burner Ignites-Locks Out	Burner Shuts Off prior to T'Stat being Satisfied	Short Cycles	Long Cycles	Soot and /or Fumes	Too Much Heat	Not Enough Heat		
Power Failure	●									Test Voltage	S-1
Blown Fuse	●									Test Voltage	S-4
Loose Connection	●									Check Wiring	S-2
Shorted or Broken Wires	●									Check Wiring	S-3
No Low Voltage	●									Check Transformer	S-4
Faulty Thermostat	●				●	●		●		Check Thermostat	S-3
Faulty Transformer	●									Check Transformer	S-4
Poor or High Resistance Ground			●							Measure Ground Resistance	S-13
Improper Heat Anticipator Setting					●	●		●	●	Adjust Heat Anticipator Setting	S-3
Improper Thermostat Location					●	●		●	●	Relocate Thermostat	
Faulty Limit or Roll Out Switch		●		●						Test Control	S-5 & 7
Faulty Flame Sensor			●							Test Flame Sensor	S-14
Faulty Ignition Control	●	●	●							Test Control	S-13
Gas Valve or Gas Supply Shut Off		●								Turn Valves to On Position	S-11
Faulty Induced Draft Blower		●					●			Test Blower	S-9
Broken or Shorted Ignitor		●								Test Ignitor	S-12
Dirty Flame Sensor, Low µA			●							Clean Flame Sensor	S-14
Flame Sensor not in Flame, Low µA			●							Test/Adjust Position of Flame Sensor	S-14
Faulty Gas Valve		●					●		●	Replace Gas Valve	S-11
Open Auxiliary Limit		●		●						Reset Control	S-6
Improper Air Flow or Distribution				●					●	Check Duct Static	S-21
Cycling on Limit				●	●				●	Check Controls & Temperature Rise	S-5 & 22
Delayed Ignition							●			Test for Delayed Ignition	S-19
Flashback							●			Test for Flashback	S-20
Orifice Size							●	●	●	Check Orifices	S-16
Gas Pressure		●					●	●	●	Check Gas Pressure	S-18
Cracked Heat Exchanger							●			Check Burner Flames	S-15
Stuck Gas Valve		●					●	●		Replace Gas Valve	S-11
Furnace Undersized						●			●	Replace with Proper Size Furnace	
Faulty Pressure Switch		●	●	●						Test Pressure Switch	S-8
Blocked or Restricted Flue							●			Check Flue/Drawdown Pressure	S-8
Open Roll Out Switch		●	●							Test Control	S-7
Bouncing On Pressure Switch			●	●						Test Negative Pressure	S-8

SERVICING

SERVICING SECTION INDEX

SERVICING

S-1 CHECKING VOLTAGE

WARNING

HIGH VOLTAGE
DISCONNECT **ALL** POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Remove the burner door on 80% furnace or blower compartment door on 90% furnace to gain entry to Junction Box.
2. Remove cover from Junction Box and gain access to incoming power lines.

With Power ON:

WARNING

LINE VOLTAGE NOW PRESENT

3. Using a voltmeter, measure the voltage across the hot and neutral connections.

NOTE: To energize the furnace, the Door Interlock Switch must be engaged at this point.

4. No reading - indicates open wiring, open fuse, no power, or etc. from unit to fused disconnect service. Repair as needed.
5. With ample voltage at line voltage connectors, energize the furnace blower motor by jumpering terminals R to G on the integrated ignition control.
6. With the blower motor in operation, the voltage should be 115 volts ± 10 percent.
7. If the reading falls below the minimum voltage, check the line wire size. Long runs of undersized wire can cause low voltage. If wire size is adequate, notify the local power company of the condition.
8. After completing check and/or repair, replace Junction Box cover and reinstall burner compartment door on 80% or blower compartment door on 90% furnace.
9. Turn on electrical power and verify proper unit operation.

S-2 CHECKING WIRING

WARNING

DISCONNECT ELECTRICAL POWER SUPPLY.

1. Check wiring visually for signs of overheating, damaged insulation and loose connections.
2. Use an ohmmeter to check continuity of any suspected open wires.
3. If any wires must be replaced, replace with AWM, 105°C. 4/64 thick insulation of the same gauge or its equivalent.

S-3 CHECKING THERMOSTAT, WIRING AND ANTICIPATOR

S-3A Thermostat and Wiring

WARNING

DISCONNECT ELECTRICAL POWER SUPPLY.

1. Remove the blower compartment door to gain access to the thermostat low voltage wires located at the furnace integrated control module terminals.
2. Remove the thermostat low voltage wires at the furnace control panel terminal board.
3. Jumper terminals R to W (W1 and W2) on the integrated ignition control.

With Power On (and Door Interlock Switch closed):

WARNING

LINE VOLTAGE NOW PRESENT

4. Induced Draft Motor must run and pull in pressure switch.
5. If the hot surface ignitor heats and at the end of the this ignitor warm-up period the gas valve opens and the burners ignite, the trouble is in the thermostat or wiring.
6. With power off, check the continuity of the thermostat and wiring. Repair or replace as necessary.

If checking the furnace in the air conditioning mode, proceed as follows.

7. With power off, Jumper terminals R to Y (Y1 or Y2) to G.
8. Turn on the power.
9. If the furnace blower motor starts and the condensing unit runs, then the trouble is in the thermostat or wiring. Repair or replace as necessary.
10. After completing check and/or repair of wiring and check and/or replacement of thermostat, reinstall blower compartment door.
11. Turn on electrical power and verify proper unit operation.

S-3B Heating Anticipator

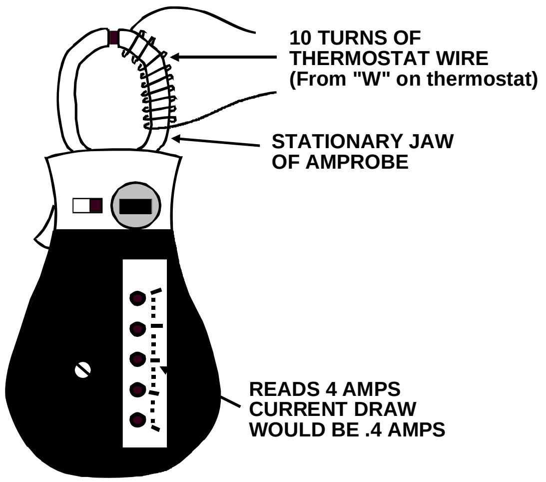
The heating anticipator is a wire wound adjustable heater which is energized during the "ON" cycle to help prevent overheating of the conditioned space.

The anticipator is a part of the thermostat and if it should fail for any reason, the thermostat must be replaced.

The heating anticipator setting for furnaces covered in this manual is **0.70 Amps**.

If the anticipator current draw is unknown, then an amp draw

should be taken to determine the anticipator setting. Use an amprobe as shown in the following drawing.



Checking Heating Anticipator Current (Amp) Draw

S-3C Cooling Anticipator

The cooling anticipator is a small heater (resistor) in the thermostat. During the "OFF" cycle it heats the bimetal element helping the thermostat call for the next cooling cycle. This prevents the room temperature from rising too high before the system is restarted. A properly sized anticipator should maintain room temperature within 1 1/2 to 2 degrees range.

The anticipator is fixed in the subbase and is not to be replaced. If the anticipator should fail for any reason, the subbase must be changed.

S-4 CHECKING TRANSFORMER AND CONTROL CIRCUIT

A step-down transformer 120 volt primary to 24 volt secondary, 40 VA (Heating and Cooling Models) supplies ample capacity of power for either operation.

WARNING

DISCONNECT ELECTRICAL POWER SUPPLY.

1. Remove blower compartment door to gain access to the thermostat low voltage wires located at the furnace integrated control module.
2. Remove the thermostat low voltage wires at the furnace integrated control module terminals.

With Power On (and Door Interlock Switch closed):

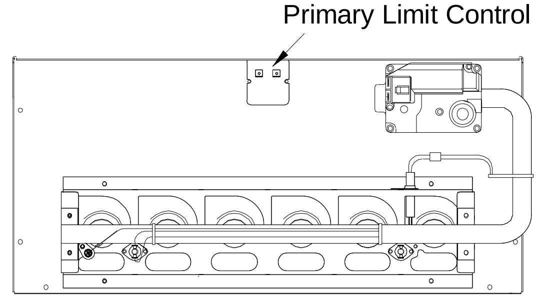
WARNING

LINE VOLTAGE NOW PRESENT

3. Use a voltmeter, check voltage across terminals R and C. Must read 24 VAC.
4. No voltage indicates faulty transformer, open fuse, bad wiring, bad splice, or open door interlock switch.
5. Check transformer primary voltage at incoming line voltage connections, fuse, splices, and blower door interlock switch.
6. If line voltage is available to the primary side of transformer and not at secondary side, the transformer is inoperative. Replace.
7. After completing check and/or replacement of transformer and check and/or repair of control circuit, reinstall blower compartment door.
8. Turn on electrical power and verify proper unit operation.

S-5 CHECKING PRIMARY LIMIT CONTROL

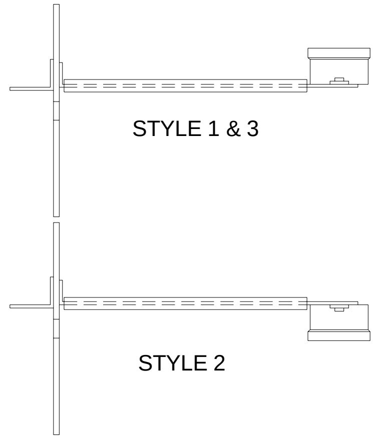
All 80% furnaces use a nonadjustable, automatic reset, Klixon type limit control (stat on a stick), part number 107283__. Refer to the following drawing for location of the primary limit on the 80% furnaces.



Primary Limit Control Location
(80% Upflow Furnace Shown, Counterflow Similar)

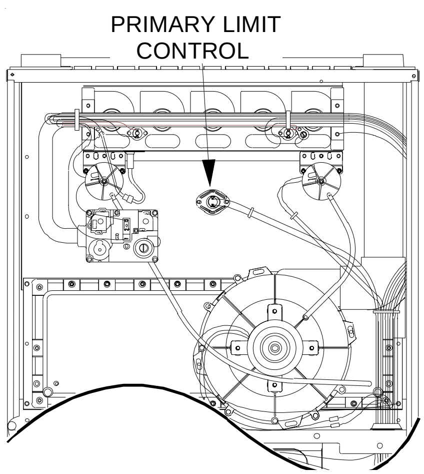
Style 1 is an open face limit, styles 2 and 3 are closed face limits. Limit styles are not interchangeable, use only the limit listed for that furnace. The following drawing illustrates the different styles of limit switches used on the 80% furnaces.

SERVICING



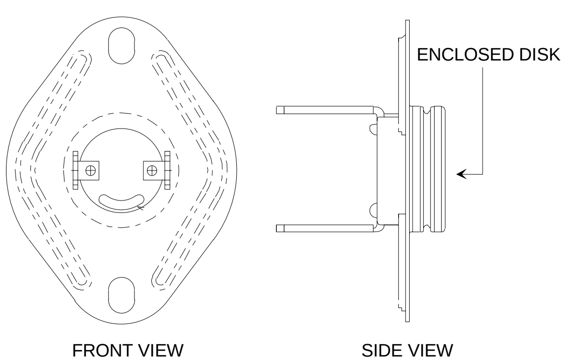
Primary Limit Control Styles
(80% Furnaces)

All 90% furnaces use a nonadjustable, automatic reset, Klixon type limit control part number 201629_ _. Refer to the following drawing for location of the primary limit on the 90% furnaces.



Primary Limit Control Location
(90% Upflow Furnace Shown, Counterflow Similar)

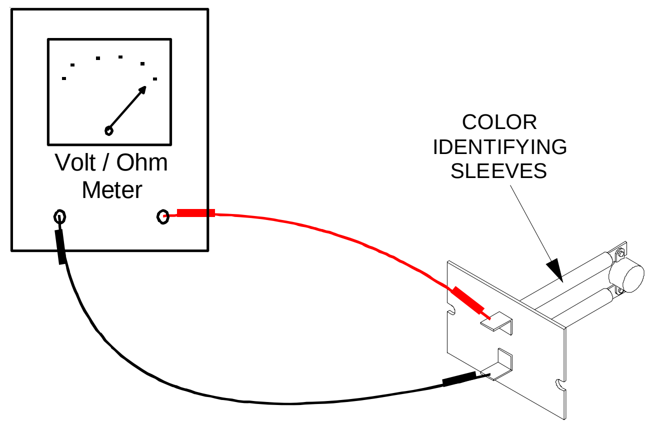
The following drawing illustrates the style of limit switches used on the 90% furnaces.



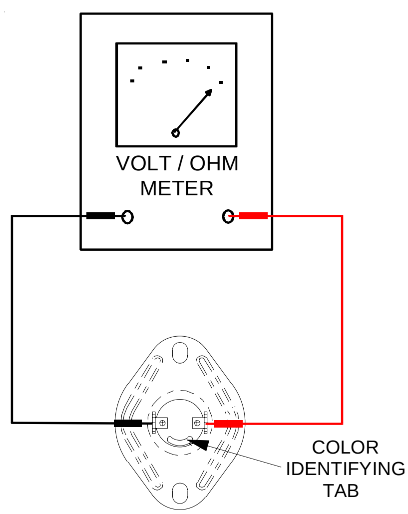
Primary Limit Control Style
(90% Furnaces)

> **⚠ WARNING**
>
> **HIGH VOLTAGE**
> **DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

1. Remove burner compartment door to gain access to the primary limit.
2. Remove low voltage wires at limit control terminals.
3. With an ohmmeter, test between these two terminals as shown in the following drawing. Should read continuous unless heat exchanger temperature is above limit control setting. If not as above, replace the control.



Testing Primary Limit Control
(80% Furnaces)



Testing Primary Limit Control
(90% Furnaces)

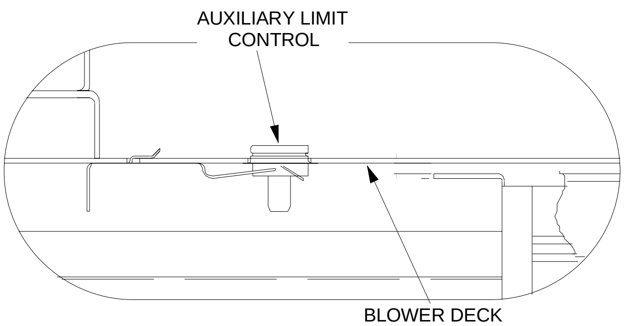
4. After completing check and/or replacement of primary limit control, reinstall burner compartment door.
5. Turn on electrical power and verify proper unit operation.

To aid in identifying these controls, refer to the *T.O.D. Primary Limit Charts* in furnace Technical Manual for style number, temperature setting and sleeve color(s) code.

S-6 CHECKING AUXILIARY LIMIT CONTROL

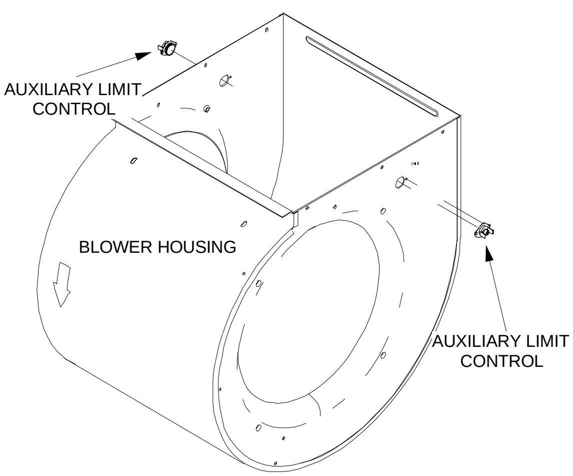
All the 80% and 90% furnaces use an additional limit switch required for safety control of high temperature within the furnace or duct work. This control is preset, nonadjustable and must be manually reset. The control is located in the blower compartment of the furnace either on the blower deck or blower housing.

The auxiliary manual reset limit is located on the lower side of the blower deck, near the center, on all 80% furnaces and on the 90% GUCA, **GULA** and GUSA furnaces, as shown in the following illustration.



Auxiliary Limit Control Location (All 80% Furnaces & 90% GUCA Furnace)

The auxiliary manual reset limits (Qty 2) are located on the blower housing (one on each side) on 90% GCCA, **GCLA, GCVA** and GUVA furnaces, as shown in the following illustration.



Auxiliary Limit Control Location (90% GCCA, GCLA, GCVA & GUVA Furnaces)

The auxiliary limit control is connected in series with the primary limit control wiring to the integrated ignition control. If its temperature should be exceeded, it will open, interrupting the voltage to the gas valve causing it to close.

If this limit control opens, the air circulation blower and induced draft blower will run continuously on models with White-Rodgers 50A50, 50A51 or Heatcraft HSI 1-1A ignition control. On models with the White-Rodgers 50A55, 50M61, 50V61 or Heatcraft HSI-2 ignition control, "only" the air circulation blower will run continuously. The diagnostic light will flash four times. These symptoms are identical to a trip of the primary limit control.

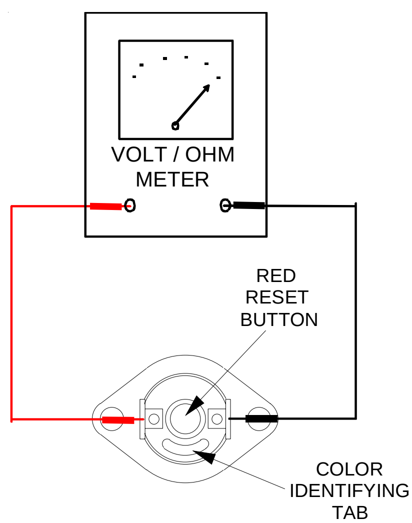
The auxiliary limit control is designed to prevent furnace operation in case of main blower failure on horizontal or counterflow installations. It may also open if the power supply is interrupted while the furnace is firing.

The auxiliary limit control is suitable for both horizontal right and horizontal left installations. Regardless of airflow direction, it does not need to be relocated.

WARNING

DISCONNECT ELECTRICAL POWER SUPPLY.

1. Remove blower compartment door to gain access to the auxiliary limit control which is located on the lower side of the blower deck on all 80% furnaces and on 90% GUCA, **GULA** and GUSA furnaces, or on the blower housing on 90% GCCA, **GCLA, GCVA** and GUVA furnaces.
2. Remove the wires from the auxiliary limit control terminals.
3. Use an ohmmeter, test for continuity across the two terminals (refer to the following auxiliary limit control figure). No reading indicates the control is open. Push red reset button, test again - if still open, replace the control.



Testing Auxiliary Limit Control (80% & 90% Furnaces)

WARNING

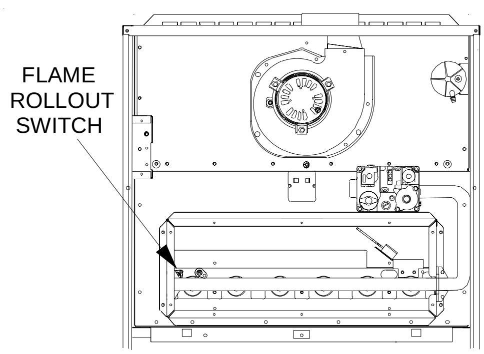
To avoid possible fire, only reset the auxiliry limit control once. If it should open a second time, a qualified servicer must determine why the auxiliary limit opened before resetting again.

NOTE: If it becomes necessary to slide the blower assembly out of any of the 80% furnaces or the 90% GUCA, GULA or GUSA furnace, the auxiliary limit control must be removed from the blower deck before the blower assembly can be removed. After the blower assembly is reinstalled, the auxiliary limit must be reinstalled.

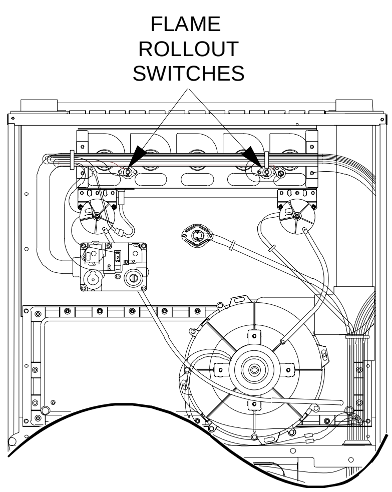
To aid in identifying these controls, color coded labels are attached to the back of the controls. Refer to the *Auxiliary Limit Charts* in furnace Technical Manual for color codes and temperature settings.

S-7 CHECKING FLAME ROLLOUT CONTROL

A temperature activated manual reset control is mounted to the manifold assembly on 80% & 90% furnaces, as shown in the following illustrations.



Flame Rollout Switch Location
(80% Upflow Furnace Shown, Counterflow Similar)



Flame Rollout Switch Location
(90% Upflow Furnace Shown, Counterflow Similar)

The control is designed to open should a flame roll out occur. An over firing condition or flame impingement on the heat shield may also cause the control to open. If the rollout control opens, the air circulation blower and vent blower will run continuously. On models with the White-Rodgers 50A51, 50M61 and 50V61 ignition controls the diagnostic light will flash four times. These symptoms are identical to a trip of the primary limit control. On models with the White-Rodgers 50A50, 50A55 or Heatcraft HSI 1-1A or HSI-2 ignition control, the diagnostic light will flash five times indicating a trip of the rollout switch.

To aid in identifying these controls, color coded labels have been affixed to the back of these controls. Refer to the *Rollout Limit Charts* in furnace Technical Manual for temperature settings and color codes.

If the rollout control has opened the circuit between the ignition control and gas valve will be interrupted.

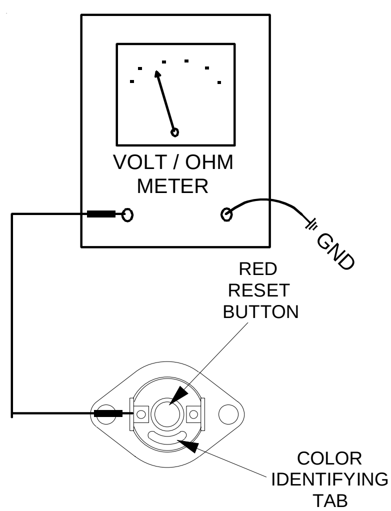
WARNING

Line voltage now present

1. Remove the burner compartment door to gain access to the rollout switch(es) mounted to burner bracket.

The servicer should reset the ignition control by opening and closing the thermostat circuit. Then look for the ignitor glowing which indicates there is power to the ignition control. Measure the voltage between each side of the rollout control and ground while the ignition control tries to power the gas valve.

2. Measure the voltage between each side of the rollout control and ground during the ignition attempt. Refer to the following figure.



Checking Flame Rollout Switch
(80% & 90% Furnaces)

a. If no voltage is measured on either side of control it indicates ignition control or wiring to control problem.

b. If voltage is measured on one side of the control and not the other it indicates the control is open.

c. If voltage is measured on both sides of the control the wiring to gas valve or valve is a fault.

3. After check and/or replacement of rollout switch, reinstall burner compartment door and verify proper unit operation.

S-8 CHECKING PRESSURE CONTROL

The pressure control is a safety device to prevent the combustion cycle from occurring with inadequate venting caused by a restricted or blocked vent pipe on the 80% and 90% furnaces. Also on the 90% furnaces there is a pressure control that will prevent the combustion cycle from occurring with inadequate condensate drainage due to a partial or blocked recouperator coil or drain.

⚠ WARNING

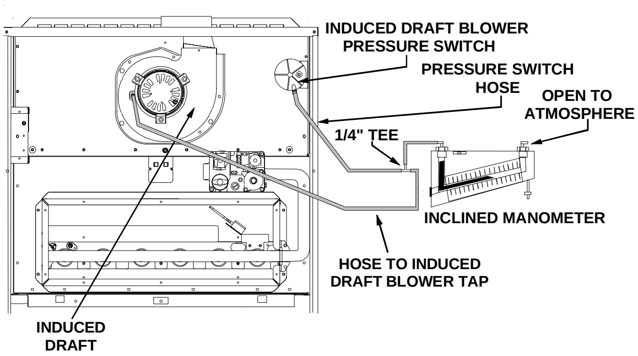
HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

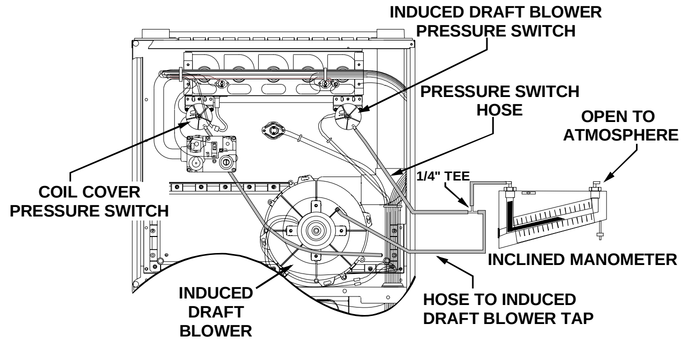
1. Remove burner compartment door to gain access to pressure switch(es).
2. Remove wires from the pressure switch(es) electrical terminals.
3. Using a VOM check from common terminal to NC (Normally Closed) - should read closed. Check from Common to NO (Normally Open) - should read open.

If switch reads as above proceed to Step 4, otherwise replace control.

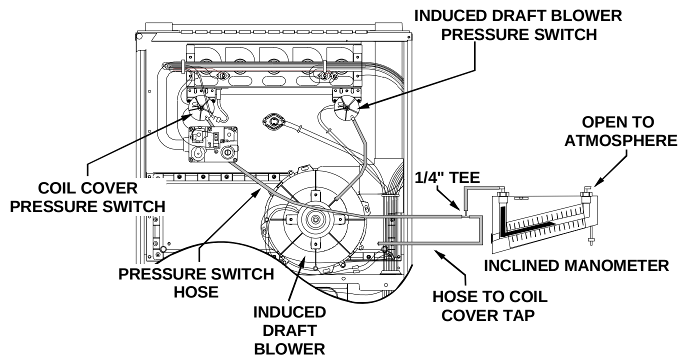
4. Remove the pressure control hose from the control and interconnect with an inclined manometer as shown in the following figures.



ID Blower Pressure Switch
Negative Pressure Measurement
(80% Upflow Furnace Shown, Counterflow Similar)



ID Blower Pressure Switch
Negative Pressure Measurement
(90% Upflow Furnace Shown, Counterflow Similar)



Coil Cover Pressure Switch
Negative Pressure Measurement
(90% Upflow Furnace Shown, Counterflow Similar)

Reconnect pressure switch electrical wires.

⚠ WARNING

Line voltage now present

4. Energize furnace for heating cycle. The induced draft blower motor will begin to run. The inclined manometer should read approximately the negative pressure shown in the *Pressure Switch Trip Points and Usage Chart*. These charts can be found in furnace Technical Manual for each model furnace.

NOTE: GUIA/B and GCIA/B furnaces can pull negative pressures in excess of -3.0" WC. Use appropriate manometer for measuring negative pressure. Refer to the *Pressure Switch Trip Points and Usage Charts* in furnace Technical Manual for pressure switch usage and trip points.

5. Remove and check the two electrical wires and using the VOM check from Common to NC (Normally Closed) - should read open. Check from Common to NO (Normally Open) - should read closed. If not as above, replace control.

6. Reconnect wires to the control and place in a heating cycle.
7. Begin to restrict the flue outlet until the pressure control trips - cycling OFF the burner. Also a blocked drain test will need to be performed until the coil cover pressure control trips - cycling OFF the burner. The trip points should be as shown in the *Pressure Switch Trip Points and Usage Charts* in furnace Technical Manual.
8. If not as listed, replace control.
9. After completing check and/or repair of pressure switch, reinstall burner compartment door.
10. Turn on electrical power and verify proper unit operation.

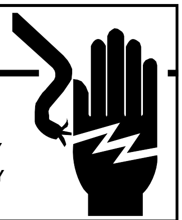
The pressure readings listed in the *Pressure Switch Trip Points and Usage Charts* in furnace Technical Manual must be adhered to for proper operation.

S-9 CHECKING AIR CIRCULATOR BLOWER MOTOR OR INDUCED DRAFT BLOWER MOTOR

WARNING

HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



1. Remove blower compartment door to gain access to the circulator blower motor and induced draft blower motor wire leads connected at integrated ignition control.
2. Disconnect the motor wire leads from its connection point at integrated ignition control module and capacitor if applicable.
3. Using an ohmmeter, test for continuity between each of the motor leads.
4. Touch one probe of the ohmmeter to the motor frame (ground) and the other probe in turn to each lead.

If the windings do not test continuous or a reading is obtained to ground, replace the motor.

5. After completing check and/or replacement of circulator blower motor or induced draft blower motor, reinstall blower compartment door.
6. Turn on electrical power and verify proper unit operation.

S-9A CHECKING VARIABLE SPEED AIR CIRCULATOR BLOWER MOTOR

The 80% and 90% Two-Stage Variable Speed furnaces incorporate the GE© ICM or variable speed blower motors for greater efficiency. ECM/ICM motors vary the motor RPMs to provide a set volume of air over a wide range of conditions. These motors use an electronic control module attached to the motor to control motor operation. Some unique features of these motors are:

1. Constant Airflow. These motors will maintain constant airflow in excess of .80 static. In other words, as the static increases so does the motors RPM so that a constant CFM is maintained.

NOTE: The motor in these units will move more air under higher static conditions than a similar sized unit using a PSC motor. Because this motor does not load up and reduce airflow like a PSC motor, in some undersized duct installations this may cause noise or high airflow complaints.

2. Ramp-up/Ramp-down feature. These motors ramp up and down at the beginning or end of a cycle to reduce air rush noise.
3. High voltage is present at these motors all the time. Motor operation is controlled through the low voltage motor interface board.

On GUIV-CA/DX and GUVA-AX models, a motor interface board mounted on the control bracket is used to control blower operation in 3 modes of operation. Fan only, cooling speed and heating speed. Refer to the *Airflow Charts* in furnace Technical Manuals for details.

The cooling and heating speeds are adjusted by relocating the jumper pins on the motor interface board.

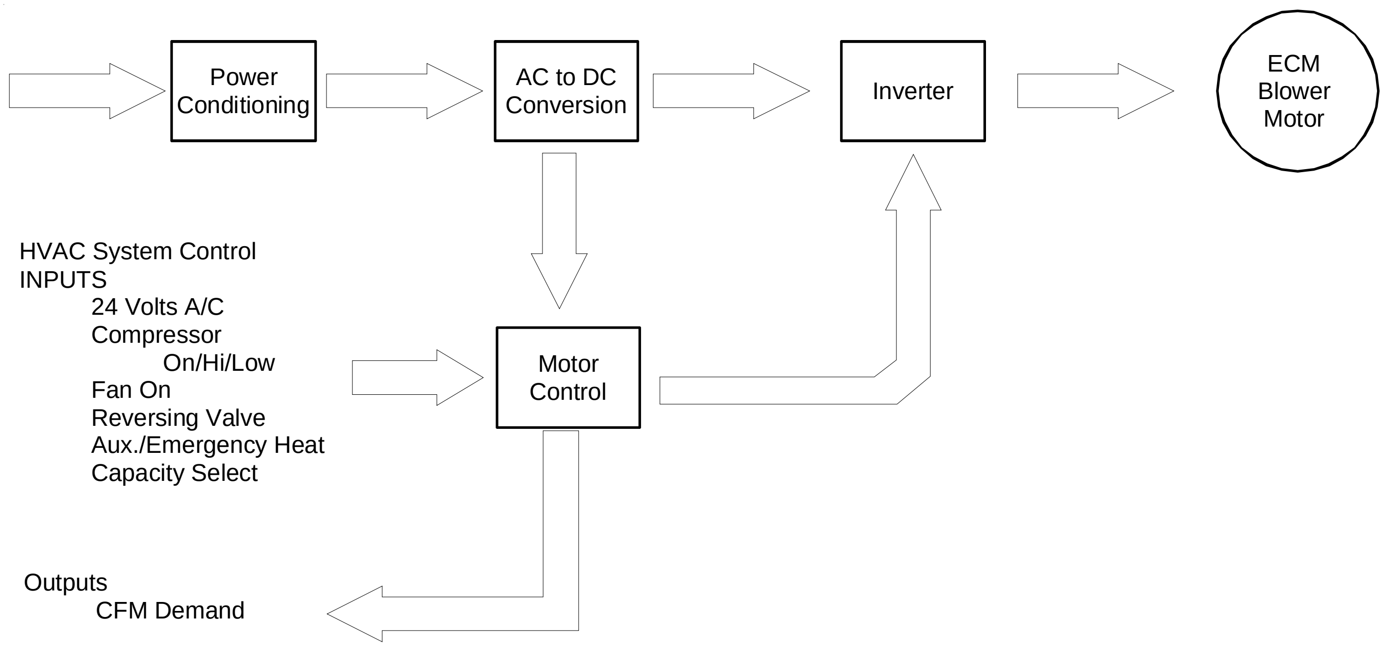
There is a LED, located on the blower interface board on GUIV-CA/DX/FX and GUVA-AX models or on the integrated ignition control on **GCVA** and GUVA-BX models, that serves to indicate the airflow that the motor is supposed to be delivering, depending upon the positioning of the pin selectors on the interface board on the GUIV-CA/DX/FX and GUVA-AX models or on the DIP switches on the integrated ignition control on the **GCVA** and GUVA-BX models. The number of blinks multiplied by 100 yields the programmed CFM (Example: 10 Blinks x 100 = 1000 CFM). The indicated CFM may vary, depending on the mode of operation and the signals being sent to the control board at the time.

ECM/ICM Control Connections

Control functions (G, Y, Y1, Y2, W, W1, W2) may be active at less than 1/2 control voltage. (i.e. 12 volts). Relay contacts on control functions must reliably switch low currents (less than 5 MA). Some thermostats (with triac switches) and Solid State Relays may allow enough "leakage" current to turn on "G". Thermostats that "steal" power thru "Y" or other functions are not compatible.

The ECM control interface can be as simple as a direct connection to the thermostat. For example: "R" to "G" will cause the fan to come at "Fan-Only" CFM, "R" to "G" to "Y" will cause the fan to come on at Cooling speed and R to G to W will cause the fan to come on at heating speed. The ECM/ICM control requires a common connection from the transformer (transformer common to C1, C2 on control). In typical applications C1 and C2 will be tied together. Additional features can be utilized through the motor interface control board, these features include; 2 Cool CFMs, 2 Dehumidification CFMs, 2 Heat CFMs, separate Fan-Only CFM, and feed back information (CFM demand).

SERVICING



ECM/ICM CONTROL FLOW CHART

NOTE: An inductor *(Power Correction Factor Choke)* is required when powering the 3/4 and 1 horsepower motors with 115 volts. The operation of this inductor is to reduce the line current by storing the electrical energy in a magnetic field, such that the voltage AC waveform leads the current AC waveform. In other words, the inductor reduces line current which extends the life of the 3/4 and 1 horsepower motors. The furnaces requiring an inductor are shown in the following chart.

80% Models	90% Models
GUIV090**50	GCVA070**40
GUIV115**50	GCVA090**50
	GUVA070**40
	GUVA090**50
	GUVA115**50

IMPORTANT: If the inductor fails, there will be no motor operation since this is the "LINE" power supply, black wire (BK-6), from the integrated ignition control to the motor. To determine if the inductor is at fault, you can bypass by the inductor by disconnecting the black wire (BK-6) wire from the inductor and connecting it directly to the motor. If the motor operates then the inductor will need to be replaced.

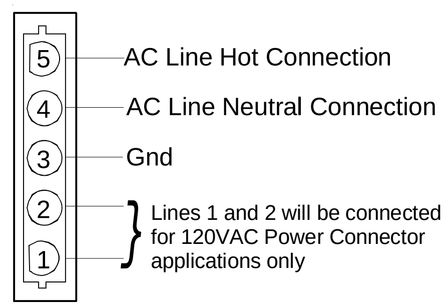
Checking ECM/ICM Motors

ECM/ICM motors connect directly to the AC Line Voltage. **DO NOT** insert contactors in series with the ECM/ICM Motor AC Line. The control is powered continuously to insure reliable start-up. The connector plug is polarized, verify and reverify correct connector orientation before applying power. **DO NOT** force plug into motor and make sure power is off before inserting power connector. **DO NOT** apply voltage to terminals 1 or 2.

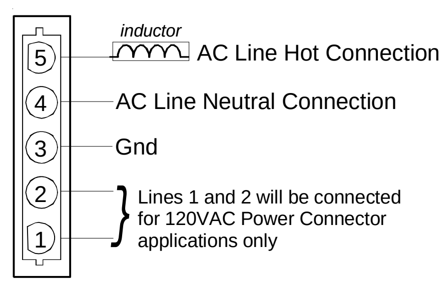
⚠ WARNING

LINE VOLTAGE NOW PRESENT

Check for line voltage on terminals 4 and 5. Verify terminal 3 is ground. terminals. Terminals 1 and 2 are jumpered in the harness for 120VAC operation.



POWER CONNECTOR
(1/2 HP MOTORS)
"Motor Half"
(Viewed from Plug End)



POWER CONNECTOR
(3/4 & 1 HP MOTORS)

Troubleshooting Chart for ECM/ICM Variable Speed Air Circulator Blower Motors

Symptoms of Abnormal Operation	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Motor rocks slightly when starting.	- This is normal start-up for variable speed motor.	----	----	----
- Motor won't start.	- No movement.	- Manual disconnect switch off or door switch open. - Blown fuse or circuit breaker. - 24 Vac wires miswired. - Unseated pins in wiring harness connectors. - Bad motor/control module. - Moisture present in motor or control module.	- Check 115 Vac power at motor. - Check low voltage (24 Vac R to C) at motor. - Check low voltage connections (G, Y, W, R, C) at motor. - Check for unseated pins in connectors on motor harness. - Test with a temporary jumper between R - G.	- Turn power OFF prior to repair. Wait 5 minutes after disconnecting power before opening motor. - Handle electronic motor/control with care.
	- Motor rocks, but won't start.	- Loose motor mount. - Blower wheel not tight on motor shaft. - Bad motor/control module.	- Check for loose motor mount. - Make sure blower wheel is tight on shaft. - Perform motor/control replacement check, ICM-2 motors only.	- Turn power OFF prior to repair. Wait 5 minutes after disconnecting power before opening motor. - Handle electronic motor/control with care.
- Motor oscillates up & down while being tested off of blower.	- It is normal for motor to oscillate with no load on shaft.	----	----	----
- Motor starts, but runs erratically.	- Varies up and down or intermittent.	- Variation in 115 Vac to motor. - Unseated pins in wiring harness connectors. - Erratic CFM command from "BK" terminal. - Improper thermostat connection or setting. - Moisture present in motor/control module.	- Check line voltage for variation or "sag". - Check low voltage connections (G, Y, W, R, C) at motor, unseated pins in motor harness connectors. - Check-out system controls - Thermostat. - Perform Moisture Check.*	- Turn power OFF prior to repair.
	- "Hunts" or "puffs" at high CFM (speed).	- Incorrect or dirty filter(s). - Incorrect supply or return ductwork. - Incorrect blower speed setting.	- Does removing panel or filter reduce "puffing"? - Check/replace filter. - Check/correct duct restrictions. - Adjust to correct blower speed setting.	- Turn power OFF prior to repair.

Chart continued on next page

Chart continued from previous page

Troubleshooting Chart for ECM/ICM Variable Speed Air Circulator Blower Motors

Symptoms of Abnormal Operation	Fault Description(s)	Possible Causes	Corrective Action	Cautions and Notes
- Motor starts, but runs erratically.	- Stays at low CFM despite system call for cool or heat CFM.	- 24 Vac wires miswired or loose. - "R" missing/not connected at motor. - Fan is delay mode.	- Check low voltage (Thermostat) wires and connections. - Verify fan is not in delay mode - wait until delay complete. - Perform motor/control replacement check, ICM-2 motors only.	- Turn power OFF prior to repair. Wait 5 minutes after disconnecting power before opening motor. - Handle electronic motor/control with care.
	- Stays at high CFM.	- "R" missing/not connected at motor. - Fan is delay mode.	- Is fan in delay mode? - wait until delay time complete. - Perform motor/control replacement check, ICM-2 motors only.	- Turn power OFF prior to repair. Wait 5 minutes after disconnecting power before opening motor. - Handle electronic motor/control with care.
	- Blower won't shut off.	- Current leakage from controls into G, Y, or W.	- Check for Triac switched t'stat or solid state relay.	- Turn power OFF prior to repair.
- Excessive noise.	- Air noise.	- High static creating high blower speed. - Incorrect supply or return ductwork. - Incorrect or dirty filter(s). - Incorrect blower speed setting.	- Check/replace filter. - Check/correct duct restrictions. - Adjust to correct blower speed setting.	- Turn power OFF prior to repair.
	- Noisy blower or cabinet.	- Loose blower housing, panels, etc. - High static creating high blower speed. - Air leaks in ductwork, cabinets, or panels.	- Check for loose blower housing, panels, etc. - Check for air whistling thru seams in ducts, cabinets or panels. - Check for cabinet/duct deformation.	- Turn power OFF prior to repair.
	- "Hunts" or "puffs" at high CFM (speed).	- High static creating high blower speed. - Incorrect or dirty filter(s). - Incorrect supply or return ductwork. - Incorrect blower speed setting.	- Does removing panel or filter reduce "puffing"? - Check/replace filter. - Check/correct duct restrictions. - Adjust to correct blower speed setting.	- Turn power OFF prior to repair.
- Evidence of Moisture.	- Motor failure or malfunction has occurred and moisture is present.	- Moisture in motor/control module.	- Replace motor and perform Moisture Check.*	- Turn power OFF prior to repair. Wait 5 minutes after disconnecting power before opening motor. - Handle electronic motor/control with care.

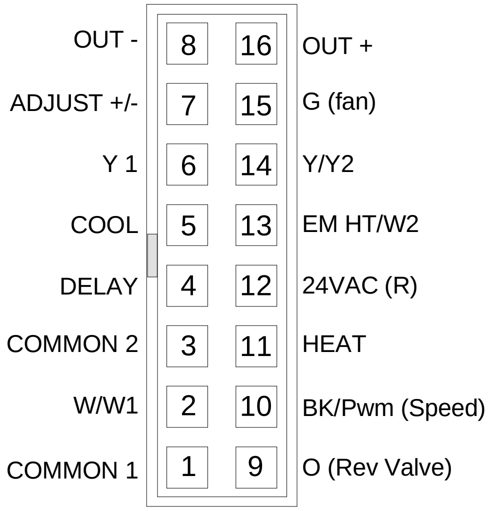
<u>*MOISTURE CHECK:</u>

- Connectors are oriented "down" (or as recommended by equipment manufacturer).
- Arrange harnesses with "drip loop" under motor.
- Is condensate drain plugged?
- Check for low airflow (too much latent capacity).
- Check for undercharged condition.
- Check and plug leaks in return ducts, cabinet.

NOTE: You must use the correct replacement control motor module since they are factory programmed for specific operating modes. Even though they look alike, different modules may have completely different functionality. The ECM variable speed motors are currently the only motors that can have the motor/control module replaced.

IMPORTANT NOTE: Using the wrong motor/control module voids all product warranties and may produce unexpected results.

"Motor Half"
(Viewed from Plug End)



CONTROL CONNECTOR
"Motor Half"
(Viewed from connector end)

CAUTION

HIGH VOLTAGE ON CONTROL PINS WILL DESTROY MOTOR.

Do not apply 24 volts to terminals "Out +" or "Out -".

Make sure connector is fully seated.

Make sure pins are fully seated in connector housing.

Verify C1 and C2 are connected to transformer common.

Verify "R" is connected to transformer hot.

After verifying above connections, motor can be tested by applying 24 volts to control pins. Example: R to G will cause the fan to come at "Fan-Only" CFM, R to G to Y will cause the fan to come on at cooling speed and R to G to W will cause the fan to come on at heating speed.

If motor does not respond as noted, ICM control unit is bad and should be replaced.

Replacing ICM Control Module

Use the following steps to replace the control module for the GE© variable speed indoor blower motor.

1. You must have the correct replacement module. The controls are factory programmed for specific operating modes. Even though they look alike, different modules may have completely different functionality. Using the wrong control module voids all product warranties and may produce unexpected results.
2. Remove all power from the unit being serviced. Do not work on the motor with power applied. Wait at least 5 minutes after disconnecting power from the equipment before opening the motor.
3. It is usually not necessary to remove the motor from the blower assembly. However it is recommended that the whole blower assembly, with the motor, be removed. Unplug the two cable connectors to the motor. There are latches on each connector. Do not pull on the wires. The plugs remove easily when properly released.
4. Observe the flat end of the motor control module casting and locate the two standard ¼" hex head bolts. Remove these bolts from the motor while holding the control module. **Do not remove the two torx head screws**.
5. The control module is now free of the motor but still attached by a plug and cable. Carefully rotate the control so as to gain access to the plug on the end of the cable. Squeeze the release latch and gently pull the plug out of the control module. Do not pull on the wires. Grip the plug only.
6. The control module is now completely detached from the motor. Verify with a standard ohmmeter that the resistance from each motor lead (in the motor plug just removed) to the motor shell is greater than 100k ohms. (Measure resistance to unpainted motor end plate). If any motor lead fails this test do not proceed to install the control module. The motor is defective and must be replaced. Installing the new control module will cause it to fail also.
7. Verify that the replacement control module is correct for your application. If so, orient the new module next to the motor and carefully insert the plug removed in step 5. Be sure the plug latches. It will click when properly inserted.
8. Install the new control module back on the motor being careful to engage the locating pin into the appropriate mating motor hole. Replace the two 1/4" hex head bolts. Tighten the bolts snugly. It is not necessary to overtighten.

Note: Before replacing the blower/motor assembly, it is important to look at the installation to see if some application fault has caused the motor to fail.

Is there any evidence of water damage to the failed control? (Corrosion on the inside or outside of the casting.) If yes, do moisture check.

9. Re-install the blower/motor assembly into the furnace.
10. Plug the 16-pin control plug into the motor. The plug is keyed. Make sure the connector is properly seated and latched.
11. Plug the 5 pin power connector into the motor even though the plug is keyed, observe the proper orientation. Do not force the connector. It plugs in very easily when properly oriented. **Reversing this plug will cause immediate failure of the control module**.
12. Final installation check. Make sure the motor is installed as follows:
    a. As far into the blower housing as possible.
    b. Belly bands not covering vent holes or on the control module.

c. Motor connectors should oriented as to prevent the accumulation of moisture in the control.

d. Use wire ties to create a drip loop in the motor cables.

13. The installation is now complete. Reapply power to the furnace and verify that the new motor control module is working properly.

For complete troubleshooting information on the variable speed air circulator blower motors, refer to the *Troubleshooting Chart for ECM/ICM Variable Speed Air Circulator Blower Motors* in this manual.

S-10 CHECKING CAPACITOR

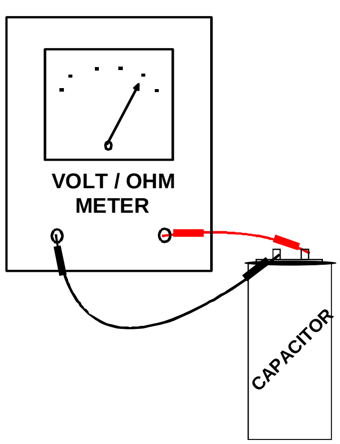
The direct drive motors are of the permanent split capacitor design. A run capacitor is wired across the auxiliary and a portion of the main windings. The capacitors primary function is to reduce the line current while greatly improving the torque characteristics of a motor. This is accomplished by using the 90° phase relationship between the capacitor current and voltage in conjunction with the motor windings so that the motor will give two phase operation when connected to a single phase circuit. The capacitor also reduces the line current to the motor by improving the power factor to the load.

WARNING

DISCHARGE CAPACITOR THROUGH A 20 TO 30 OHM RESISTO BEFORE HANDLING.

Two quick ways to test a capacitor are a resistance and a capacitance check. Refer to the next two figures for proper meter connections for the resistance and capacitance testing of the capacitor.

S-10A Resistance Check



Testing Capacitor Resistance

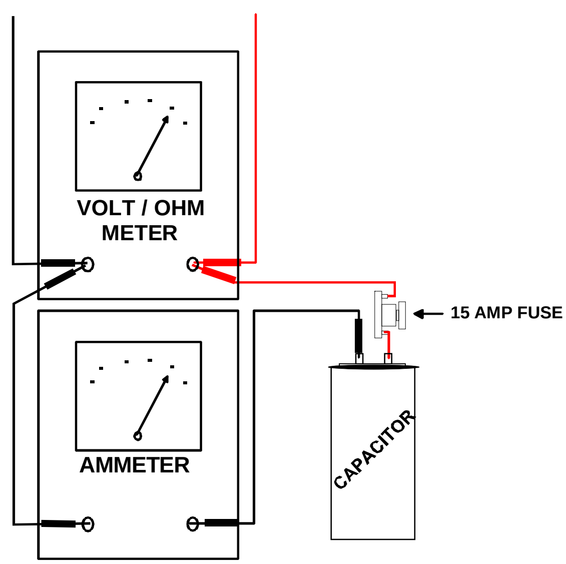
WARNING

HIGH VOLTAGE

DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Remove blower compartment door to gain access to capacitor.
2. Discharge capacitor and remove wire leads.
3. Set an ohmmeter on its highest ohm scale and connect the leads to the capacitor.
   a. Good Condition - indicator swings to zero and slowly returns toward infinity.
   b. Shorted - indicator swings to zero and stops there - replace.
   c. Open - no reading - replace. Reverse leads. Check again no reading - replace.
   d. Reverse leads and recheck.

S-10B Capacitance Check



Testing Capacitance

With power On (and Door Interlock Switch closed):

WARNING

LINE VOLTAGE NOW PRESENT

Using a hookup as shown above, take the amperage and voltage readings and use them in the formula:

Capacitance (MFD)= 2650 x Amperage/Voltage

4. After completing check and/or replacement of capacitor, reinstall blower compartment door.
5. Turn on electrical power and verify proper unit operation.

S-11 CHECKING GAS VALVE (Redundant)

A combination redundant operator type gas valve which provides all manual and automatic control functions required for gas fired heating equipment is used.

The valve provides control of main burner gas flow, pressure regulation, and 100 percent safety shut-off.

> **WARNING**
>
> **HIGH VOLTAGE**
> **DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

1. Remove wire connections from gas valve terminals.
2. Using an ohmmeter, test across the gas valve coil terminals, both the redundant and the main valve.
3. Should read approximately 130 Ohms for the Robertshaw main valve operator coils and 100 Ohms for Honeywell. The redundant coil will vary somewhat as well.
4. Reverse leads some redundant coils have (dividers) diodes.

Resistance of the redundant and 2nd stage coils on White-Rodgers 36E series gas valves can't be measured at the valve terminals with an ohmmeter because of diodes. The on/off switch may affect the resistance measurement.

1. Remove the switch panel and measure the coils directly.
2. Using an ohmmeter, test across the coils. A coil's resistance increases with increasing temperature.

   Nominal Coil Resistance:

   Main = 95 ohms

   Redundant = 98 ohms

   2nd Stage = 180 ohms
3. Allow at least 20% tolerance for temperature and meter variation. Most of the time coils will fail as open circuit.

If not as above, replace the entire valve.

S-12 CHECKING HOT SURFACE IGNITOR

The 80% furnaces use a 120V silicone carbide resistive element ignitor for ignition. The normal operating temperature is approximately 2550°F. The 90% GUCA, GCCA, **GCLA-AX/BX, GUIE-EX, GULA-AX/CX** and GUVA-AX model furnaces use a 120V ceramic/metallic composite mini-ignitor for ignition. The normal operating temperature is approximately 2192° - 2642°F. The 90% **GCVA-BX/CX,** GUSA-BX, GUIS-FX, GUIV-FX, GUIC-FX, GCIC-FX and GUVA-BX model furnaces use a 80V Silicon Nitride (SiNi) ignitor for ignition. The nominal operating temperature is approximately 2174°F. **NOTE:** The *Silicon Nitride Ignitor* is **not** interchangeable with carbide ignition controls.

> **WARNING**
>
> **DISCONNECT ELECTRICAL POWER SUPPLY.**

1. Remove burner compartment door to gain access to the ignitor.
2. Ignitor cool - approximately 70 - 77°F.
3. Disconnect the ignitor from the Ignition Control.
4. Using an ohmmeter measure the resistance of the ignitor:

   80% Furnaces: Should read between 50 to 200 ohms.

   90% GUCA,GCCA and GUVA-AX Model Furnaces: Should read between 50 to 300 ohms for mini ignitor part number 20165701, used in initial production of GUCA and GCCA models.

   90% GUCA, GCCA, **GULA-AX/CX** *and GUVA-AX Model Furnaces:* Should read between 30 to 175 ohms for mini ignitor part number 20165702, used in later production of GUCA, GCCA and also used on GUVA models.

   90% **GCLA-AX/CX, GUID-AX/GA/EX and GUIE-EX** *Model Furnaces:* Should read between 30 to 300 ohms for mini ignitor part number 20165703.

   90% GUSA-BX and GUVA-BX/CX Model Furnaces: Should read between a minimum of 10.9 to a maximum of 19.7 ohms **for Silicon Nitride (SiNi) ignitor part number 11111701.**
5. Reconnect ignitor.

> **WARNING**
>
> **LINE VOLTAGE NOW PRESENT**

6. Place unit in heating cycle, measure current draw of ignitor during preheat cycle.

   80% Furnaces: Should read approximately 4 to 5 amps.

   90% GUCA, GCCA, **GCLA-AX/BX, GUIE-EX, GULA-AX/CX** *and GUVA-AX Model Furnaces:* Should read approximately 1 amp maximum. The steady state current at 120V is a nominal of .7 plus or minus .3 amps.

90% **GCVA-BX/CX,** GUSA-BX and GUVA-BX Model Furnaces: Should read approximately 1 to 3 amps. **NOTE:** Due to the *"Adaptive Ignitor Modulation Routine"* of the 50M/V61 and 50A65 integrated ignition controls, the amp reading will fluctuate when reading with standard amp meter.

7. After check and/or replacement of hot surface ignitor, reinstall burner compartment door and verify proper unit operation.

S-13 CHECKING WHITE-RODGERS 50A50, 50A51, 50A65, 50M61 or 50V61 AND HEATCRAFT HSI 1-1A OR HSI-2 INTEGRATED IGNITION CONTROLS

NOTE: Failure to earth ground the furnace, reversing the neutral and hot wire connection to the line (polarity), or a high resistance connection in the neutral line may cause the control to lockout due to failure to sense flame.

CAUTION

TO AVOID THE RISK OF ELECTRICAL SHOCK, WIRING TO THE UNIT MUST BE PROPERLY POLARIZED AND GROUNDED. DISCONNECT POWER BEFORE PERFORMING SERVICE LISTED BELOW.

The ground wire must run from the furnace all the way back to the electrical panel. Proper grounding can be confirmed by disconnecting the electrical power and measuring resistance between the neutral (white) connection and the burner closest to the flame sensor. Resistance should be less than 10 ohms.

The ignition control is a combination electronic and electromechanical device and is not field repairable. Complete unit must be replaced.

The White-Rodgers 50A50 or 50A51 and the Heatcraft HSI 1-1A or HSI-2 ignition controls, control all furnace operations including blower operation in air conditioning. Blower time delays are controlled by the ignition control, see *Circulator Blower Timings* section in this manual for blower delay information.

WARNING

LINE VOLTAGE NOW PRESENT

These tests must be completed within a given time frame due to the operation of the ignition control. Refer to *Sequence of Operation* section of this manual for corresponding timing charts.

The ignition control is capable of diagnosing many furnace failures to speed troubleshooting. A flashing red or green diagnostic indicator light on the control flashes a code for any discovered failures.

When the control is powered up normally the light will flash once for about one second. This can be used to test for 120 volts and 24 volts to the control since both must be present for the light to flash. If this step fails, check for 120 volts to the control and check the transformer and its associated wiring. If this step is successful give the control a call for heat and wait five (5) seconds or until the furnace goes into lockout. If the control detects a failure it will now be shown on the diagnostic indicator light. Refer to the *Abnormal Operation* section in the *Sequence of Operation* section of this manual for more detail on failure codes.

The indicator light may be viewed by looking through the sight glass in the blower compartment door. If the blower compartment door is removed, failure to hold the door switch closed while removing the blower compartment door will result in the loss of the stored failure code. In most cases recycling the ignition control will result in the same failure code originally displayed.

1. Check for 120 volts from Line 1 (*BK-6* wire on GUIA, GCIA, GUIC, GCIC, GUID, GUIS, GCIS and GUIV models or *BK-4* wire on GUCA, **GULA,** GCCA, **GCLA, GUIE,** GUVA and GUSA models) to line 2 neutral (*WH-33* wire on GUIA, GCIA, GUIC, GCIC, GUID, GUIS, GCIS and GUIV models or *WH-5* wire on GUCA, GCCA, **GCVA,** GUVA and GUSA models) at the ignition control. No voltage - check the door switch connections and wire harness for continuity.
2. Check for 24 volts from W to C at the thermostat connections on the ignition control. No voltage - check transformer, room thermostat, and wiring.
3. Check for 120 volts to the induced draft blower by measuring voltage between terminals IND (*VT-55* wire on GUIA, GCIA, GUIC, GCIC and GUID models, or *BK* and *RD* wires on GUIS, GCIS and GUIV models, or *BK-3* wire on GUCA, **GUIE, GULA,** GCCA and **GCLA** models, or *RD-15* and *BK-3* wires on **GCVA,** GUVA and GUSA models) and neutral. No voltage - replace ignition control.
4. If voltage is present in Steps 1 through 3 and the induced draft blower is operating, check for 120 volts to the ignitor during the preheat cycle. Measure voltage between terminals IGN (*RD-22* wire on GUIA, GCIA, GUIC, GCIC, GUID, GUIS, GCIS and GUIV models, or *RD-2* wire on GCCA, **GCLA, GCVA,** GUCA, **GUIE**, **GULA**, GUVA and GUSA models) and neutral. No voltage - check pressure switch.
5. After the ignitor warmup time (see notes below), begin checking for 24 volts to the gas valve. Voltage will be present for seven seconds only if proof of flame has been established.

a. On GUIA, GCIA, GUIC, GCIC and GUID models: Measure voltage from Pin 9 MV/M1 terminal (*GY-47* wire) to Pin 12 C/C2 terminal (*BR-21* wire) on the ignition control 12 Pin connector. No voltage - replace ignition control.

b. On GUIS, GCIS and GUIV models: Measure voltage from either Pin 7 PM terminal (*GY-47* wire) or Pin 1 HI terminal (*YL-11* wire) to Pin 8 C terminal (*BR-21* wire) on the ignition control 12 Pin connector. No voltage - replace ignition control.

c. On GCCA, **GCLA, GCVA,** GUCA, **GUIE** and **GULA** models: Measure voltage from Pin 9 C2 terminal (BR-13 wire) to Pin 12 M1 terminal (GY-12 wire) on the ignition control 12 Pin connector. No voltage - replace ignition control.

d. On GUVA and GUSA models: Measure voltage from either Pin 7 PM terminal (*GY-12* wire) or Pin 2 HI terminal (*YL-20* wire) to Pin 8 C terminal (*BR-13* wire) on the ignition control 12 Pin connector. no voltage - replace ignition control.

IMPORTANT: The **GCLA, GCVA,** GUCA, GCCA, **GULA,** GUSA and GUVA model furnaces have a *"Coil Cover Pressure Switch"* in series with the M1 side of the gas valve.

NOTE: The ***White-Rodgers 50A55*** control has an adaptive algorithm that adjusts the duration of ignitor warmup for the purpose of extending igniter life. Following application of power, the warmup time will be 17 seconds for the first 64 successful ignitions. Each subsequent warmup time will be decreased by 1 second until flame fails to be achieved (resulting in a retry) or until the minimum of 5 seconds is achieved.

NOTE: The ***Heatrcraft HSI-2*** ignition control has an initial ignitor warmup time of 7 seconds. In the event of a retry, the warmup time will be increased by two seconds and that duration will remain effective until another retry. In which case, the warmup time is again increased by two seconds but never more than 11 seconds. At the end of the heat cycle, the warmup time is reset back to the minimum time setting.

NOTE: The **White-Rodgers 50M61 and 50V61** ignition controls have an ignitor warmup time of 20 seconds. These controls have a built-in learning routine that gradually reduces the "ON" time of the ignitor. The effect is that the ignitor operates at a cooler temperature. The learning routine will eventually reduce the ignitor "ON" time to a point at which the ignitor is too cold to ignite the gas. The control will then increase the "ON" time and initiate an ignition retry. The furnace will light. The control will remain at this point for 256 thermostat cycles, after which it will re-enter the learning routine. **IMPORTANT:** The *"ONLY"* way to determine if the ignitor "ON" time is changing is to view the ignitor voltage wave form with an oscilloscope.

6. If proof of flame was established voltage will be provided to the air circulation blower following the heat on delay period.

a. Check for 120 volts from the CIR terminal (*WH* wire on GUIA, GCIA, GUIC, GCIC, GUID, GUCA, **GUIE**, GCCA, **GCLA, GULA** and GUSA models, or *WH-33* wire on GUIS and GCIS models) to the heat terminal (*Heat* terminal on GUIA, GCIA, GUIC, GCIC, GUID, GUCA, GCCA and GUSA models, or *Heat-High* and *Heat-Low* terminals on GUIS, GCIS and GUSA models) on the ignition control. No voltage - replace ignition control.

b. On the 80% GUIV and 90% **GCVA,** GUVA two-stage variable speed furnaces, 120 Volts will be present at the motor at all times (*WH-33* and *BK-6* wires on GUIV and *WH-45* and *BK-37* wires on GUVA), even without a call for cooling or heating. These motors receive their operational signals (24 Volts) through the 16-pin wiring harness (connected between the motor and interface board on GUIV-CA/DX models and GUVA-AX models or connected between the motor and ignition control on **GCVA,** GUVA-BX, GUIV-FX models). **NOTE:** For complete troubleshooting information on units using the ECM/ICM blower motors, refer to the *servicing section - Checking Air Circulator Blowers (S-9A ECM/ICM)* in this service manual.

NOTE: Accessory Electronic Air Cleaners and Humidifiers powered through the ignition control accessory terminals, under some circumstances can create interference with the ignition control causing intermittent lockouts. If the source of the lockouts cannot be otherwise determined, it is recommended that these accessories be disconnected from the ignition control and powered through alternate means.

S-13A CHECKING WR50A52 INTEGRATED IGNITION CONTROL (RADIANT SENSE)

NOTE: Failure to earth ground the furnace, reversing the neutral and hot wire connection to the line (polarity), or a high resistance connection in the neutral line may cause the control to lockout due to failure to sense flame.

CAUTION

TO AVOID THE RISK OF ELECTRICAL SHOCK, WIRING TO THE UNIT MUST BE PROPERLY POLARIZED AND GROUNDED. DISCONNECT POWER BEFORE PERFORMING SERVICE LISTED BELOW.

The ground wire must run from the furnace all the way back to the electrical panel. Proper grounding can be confirmed by disconnecting the electrical power and measuring resistance between the neutral (white) connection and the burner closest to the flame sensor. Resistance should be less than 10 ohms.

The ignition control module is a combination electronic and electromechanical device and is not field repairable. Complete unit must be replaced.

The WR50A52 ignition control, controls all furnace operations including blower operation in air conditioning. Blower time delays are controlled by the ignition control and are nonadjustable, see the specification section for blower delay information.

WARNING

Line voltage now present

These tests must be completed within a given time frame due to the operation of the ignition control. See *"Sequence of Operation"* section for timing chart.

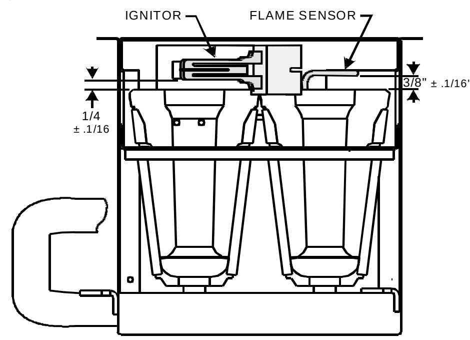
1. Check for 120 volts from Line 1 (BK6 wire) to line 2 neutral (WH-33 wire) at the ignition control. No voltage - check the door switch connections and wire harness for continuity.
2. Check for 24 volts from W to C at the thermostat connections on the ignition control. No voltage - check transformer, room thermostat, and wiring.
3. Check for 120 volts to the induced draft blower by measuring voltage between IND (VT-55) and neutral. No voltage - check for pressure switch stuck closed. If pressure switch in N.O. position replace ignition control.
4. If voltage is present in Steps 1 through 3 and the induced draft blower is operating, check for 120 volts to the ignitor during the 17 second preheat cycle. If the flame switch has not transferred, the control will continue to power the ignitor until the flame switch transfers, or for 90 seconds. Voltage will be present for one second after the gas valve has opened. Measure voltage between terminals IGN (RD-22) and neutral. No voltage - check pressure switch.
5. Seventeen seconds after a call for heat begin checking for 24 volts to the gas valve. Measure voltage from terminal 5 (YL-8 wire) to terminal 3 (RD-5) on the gas valve. No voltage - check flame switch and ignitor position.
6. If proof of flame was established 120 volts will be provided to the air circulation blower 45 seconds after the gas valve opens. Check for 120 volts from the CIR terminal (WH) wire to the heat terminal on the ignition control. No voltage - replace ignition control.

NOTE: If cycling the ignition control during testing, the flame switch must be allowed to cool and switch back to the N.C. position before the next ignition attempt.

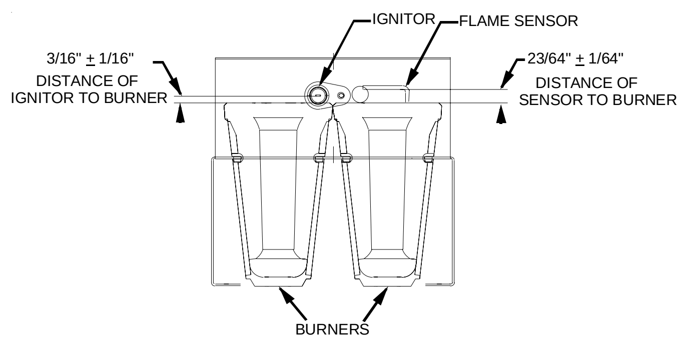
S-14 CHECKING FLAME RECTIFICATION FLAME SENSOR

A flame sensing device is used in conjunction with the ignition control module to prove combustion. If proof of flame is not present the control will de-energize the gas valve and "retry" for ignition or lockout.

The following drawings illustrate from a bottom view, the approximate distances for the ignitor and flame sensor to the gas inshot burner. You will note they are in the main burner stream, not in the carry over ports as shown in the following figure.



Models with Integrated Ignition Control & Flame Sensor Probe (80% Upflow Model Shown, Counterflow Similar)



Models with Integrated Ignition Control & Flame Sensor Probe (90% Upflow Model Shown, Counterflow SImilar)

WARNING

HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

1. Disconnect the flame sensor BU-36 wire from the sensor terminal.
2. Connect a micro-amp meter in series with this wire and the sensor terminal.
3. Be sure the positive side of the meter is to BU-36 wire and the negative side of the meter is to sensor terminal.

WARNING

LINE VOLTAGE NOW PRESENT

4. Place the unit into a heating cycle.
5. As soon as flame is established a micro-amp reading should be evident once proof of flame (micro-amp reading) is established, the hot surface ignitor will be de-energized.
6. The Integrated Ignition controls will have 1 to 4 micro-amps. If the micro-amp reading is less than the minimum specified, check for high resistance wiring connections, sensor to burner gap, dirty flame sensor, or poor grounding.
7. If absolutely no reading, check for continuity on all components and if good - replace ignition control module.

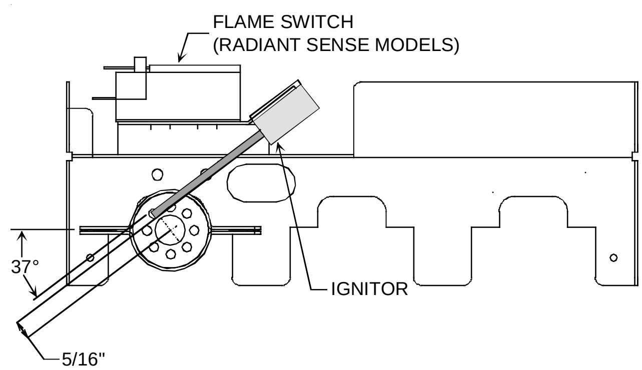
NOTE: Contaminated fuel or combustion air can create a nearly invisible coating on the flame sensor. This coating works as an insulator causing a loss in the flame sense signal. If this situation occurs the flame sensor must be cleaned with steel wool.

S-14A CHECKING RADIANT SENSE FLAME SENSOR

The Radiant Sensor is a single pole double throw switch that is activated by a combination of the heat radiating from the burner flame, and the reflected heat from the ignitor.

Once the pressure switch contacts close, power is supplied through the N.C. contacts of the Radiant Sensor to the gas valves terminal 4 (GN-7 wire). When the Radiant Sensor senses sufficient heat from the ignitor, the sensor will switch to the N.O. position suppling 24V to the gas valves terminal 5 (YL-8 wire).

If you should experience a flame sense problem with the GUIB or GCIB series furnace, it is important to verify correct positioning and alignment of the components before replacing the flame sensor. The following drawing illustrates the proper positioning and alignment of the ignitor, radiant shield, and flame sensor.



Models with WR50A52 Integrated Ignition Control & Radiant Sense Flame Sensor (80% GUIB & GCIB Models Only)

NOTE: Any bending, twisting, or distortion of the electrical tabs on the sensor will adversely affect the calibration of the switch and result in unacceptable performance of the sensor.

Refer to the Radiant Sense System Wiring Diagram in GUIB/GCIB Technical Manual for details.

WARNING

DISCONNECT ELECTRICAL POWER SUPPLY.

1 Remove burner compartment door to gain access to the radiant flame sensor.
2. Disconnect the wires from the Radiant Sensor.
3. Using a VOM check from common terminal to NC (Normally Closed) - should read closed. Check from Common to NO (Normally Open) - should read open.

WARNING

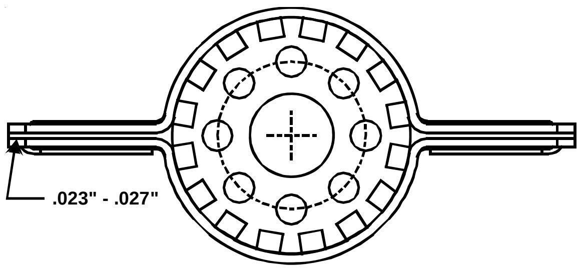
LINE VOLTAGE NOW PRESENT

4. Place unit into a heating cycle.
5. Using a VOM check from chassis ground, to pin 8 FSO (GR-9 wire) on ignition control. No power check pressure switch and ignition control.
6. Within the ignitor preheat period, check from chassis ground, to pin 12 FSI (BR-10 wire) on ignition control. No power check BR-10 wire.
6. When the Radiant Sensor senses sufficient heat it will close the N.O. contacts. Power should now be read at pin 4 MV FS (VT-12 wire). No power check VT-12 wire, replace Radiant Sensor if necessary.
7. After check and/or replacement of radiant flame sensor, reinstall burner compartment door and verify proper unit operation.

S-15 CHECKING MAIN BURNERS

The main burners are used to provide complete combustion of various fuels in a limited space, and transfer this heat of the burning process to the heat exchanger.

Proper ignition, combustion, and extinction are primarily due to burner design, orifice sizing, gas pressure, primary and secondary air, vent and proper seating of burners.



Beckett Burner

> **WARNING**
>
> **HIGH VOLTAGE**
>
> DISCONNECT **ALL** ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

In checking main burners, look for signs of rust, oversized and undersized carry over ports restricted with foreign material, etc, refer to previous drawing.

S-16 CHECKING ORIFICES

A predetermined fixed gas orifice is used in all of these furnaces. That is an orifice which has a fixed bore and position as shown in the following drawing.

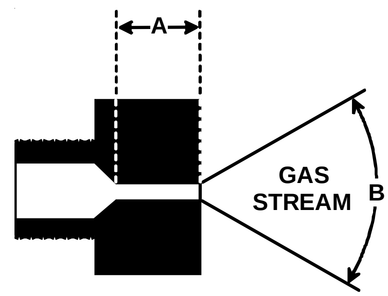
No resizing should be attempted until all factors are taken into consideration such as inlet an manifold gas pressure, alignment, and positioning, specific gravity and BTU content of the gas being consumed.

The only time resizing is required is when a reduction in firing rate is required for an increase in altitude.

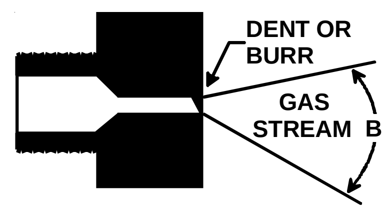
Orifices should be treated with care in order to prevent damage. They should be removed and installed with a box-end wrench in order to prevent distortion. In no instance should an orifice be peened over and redrilled. This will change the angle or deflection of the vacuum effect or entraining of primary air, which will make it difficult to adjust the flame properly. This same problem can occur if an orifice spud of a different length is substituted.

> **WARNING**
>
> **HIGH VOLTAGE**
>
> DISCONNECT **ALL** ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

1. Check orifice visually for distortion and/or burrs.
2. Check orifice size with orifice sizing drills.
3. If resizing is required, a new orifice of the same physical size and angle with proper drill size opening should be installed.



The length of Dimension "A" determines the angle of Gas Stream "B".



A dent or burr will cause a severe deflection of the gas stream.

S-17 HIGH ALTITUDE APPLICATION (USA)

When these furnaces are installed at high altitude, the appropriate High Altitude Orifice or Pressure Switch Kit must be applied. This is required due to the natural reduction in the density of both the gas fuel and combustion air as altitude increases. The High Altitude Orifice Kit will provide the proper design certified input rate within the specified altitude range.

High Altitude Orifice or Pressure Switch Kits are purchased according to the installation altitude and usage of either natural or propane gas. Refer to the Technical Manual or product Specification Sheet for a tabular listing of appropriate altitude ranges and corresponding manufacturer's high altitude (Natural or Propane Gas) orifice or pressure switch kits.

Do **not** derate the furnace by adjusting the manifold pressure to a lower pressure than specified on the furnace rating plate. The combination of the lower air density and a lower manifold pressure will prohibit the burner orifice from drawing the proper amount of air into the burner. This may cause incomplete combustion, flashback, and possible yellow tipping.

In some areas the gas supplier may artificially derate the gas in an effort to compensate for the effects of altitude. If the gas is artificially derated the appropriate orifice size must be determined based on the BTU/ft^3 content of the derated gas and the altitude. Refer to the National Fuel Gas Code, NFPA 54/ANSI Z223.1, and information provided by the gas supplier to determine the proper orifice size.

S-18 CHECKING GAS PRESSURE

Gas Supply Pressure Measurement

CAUTION

TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE INLET GAS SUPPLY PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE WITH ALL OTHER HOUSEHOLD GAS FIRED APPLIANCES OPERATING.

Gas inlet and manifold pressures should be checked and adjusted in accordance to the type of fuel being consumed.

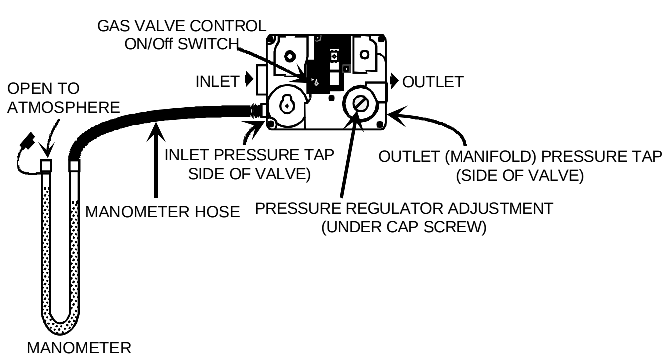
The line pressure supplied to the gas valve must be within the range specified below. The supply pressure can be measured at the gas valve inlet pressure tap or at a hose fitting installed in the gas piping drip leg. The supply pressure must be measured with the burners operating. To measure the gas supply pressure, use the following procedure.

WARNING

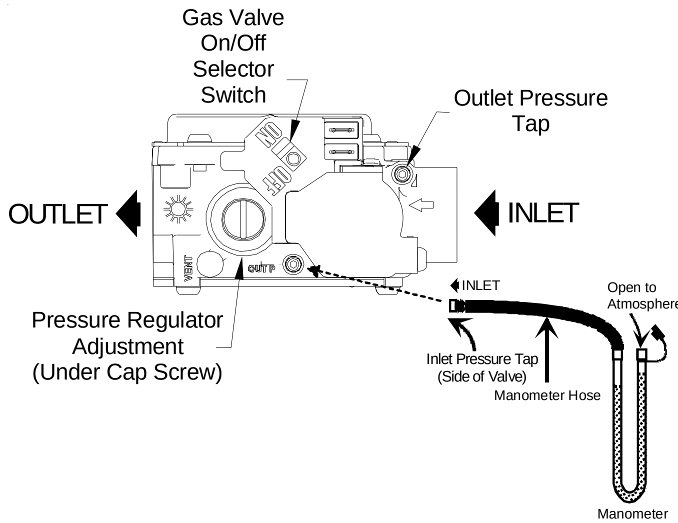
DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING.

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at either the gas valve inlet pressure tap or the gas piping drip leg as shown in the following two figures.

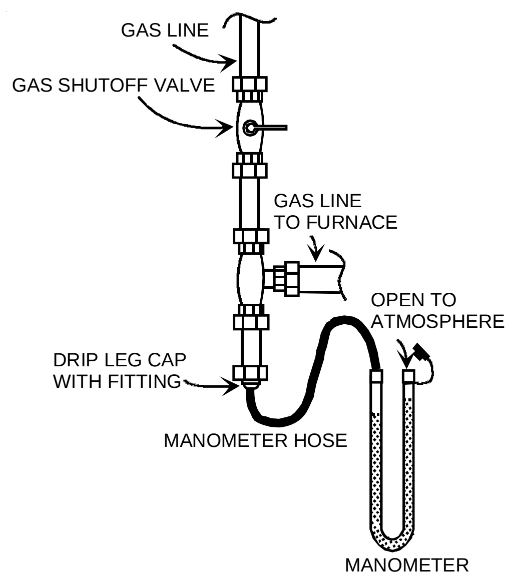
NOTE: At either location, a hose fitting must be installed prior to making the hose connection.



Measuring Inlet Gas Pressure (Gas Valve Tap)



Measuring Manifold Gas Pressure (36G Valve)



Measuring Inlet Gas Pressure (Alternate Method)

3. Turn ON the gas and electrical power supply and operate the furnace and all other gas consuming appliances on the same gas supply line.
4. Measure furnace gas supply pressure with burners firing. Supply pressure must be within the range specified in the following table.

Inlet Gas Supply Pressure	
Natural Gas	Minimum: 5.0" W.C. Maximum :10.0" W.C.
Propane Gas	Minimum:11.0" W.C. Maximum :13.0" W.C.

If supply pressure differs from above, make necessary adjustments to pressure regulator, gas piping size, etc., and/or consult with local gas utility.

⚠ WARNING

HIGH VOLTAGE
DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

5. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall plug before turning on gas to furnace.
6. Turn OFF any unnecessary gas appliances started in step 3.
7. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
8. Turn on electrical power and verify proper unit operation.

Gas Manifold Pressure Measurement and Adjustment (80% & 90% Single-Stage Furnaces)

⚠ CAUTION

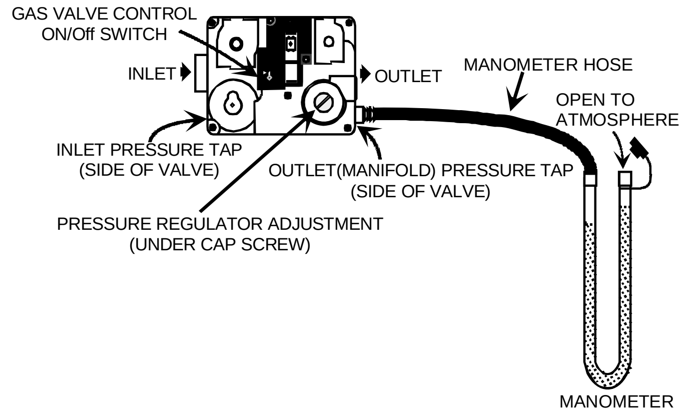
TO PREVENT UNRELIABLE OPERATION OR EQUIPMENT DAMAGE, THE GAS MANIFOLD PRESSURE MUST BE AS SPECIFIED ON THE UNIT RATING PLATE. ONLY MINOR ADJUSTMENTS SHOULD BE MADE BY ADJUSTING THE GAS VALVE PRESSURE REGULATOR.

Only small variations in gas pressure should be made by adjusting the gas valve pressure regulator. The manifold pressure must be measured with the burners operating. To measure and adjust the manifold pressure, use the following procedure.

⚠ WARNING

DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING.

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap as shown in the following figure.



Measuring Manifold Gas Pressure (Gas Valve Tap)

⚠ WARNING

LINE VOLTAGE NOW PRESENT

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Measure gas manifold pressure with burners firing. Adjust manifold pressure using the table below.

Manifold Gas Pressure	
Natural Gas	3.5" w.c.
Propane Gas	10.0" w.c.

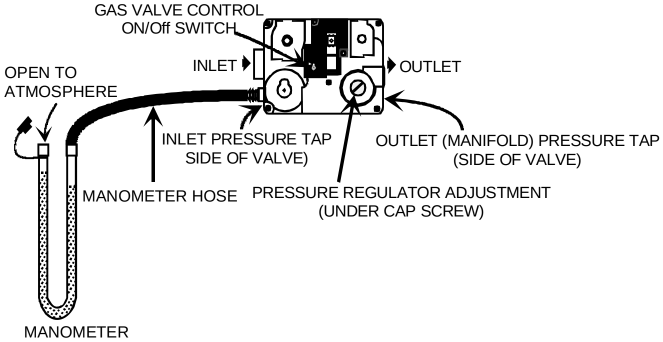
The final manifold pressure must not vary more than ± 0.3 " w.c. from the above specified pressures. Any necessary major changes in gas flow rate should be made by changing the size of the burner orifice.

5. To adjust the gas valve pressure regulator, remove the regulator cap.
6. Turn the adjustment screw clockwise to increase the pressure, or counterclockwise to decrease the pressure.
7. Securely replace the regulator cap.

⚠ WARNING

HIGH VOLTAGE
DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

8. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall gas valve outlet pressure tap plug before turning on gas to furnace.



Measuring Inlet Gas Pressure
White Rodgers 36E
(Gas Valve Tap)

9. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
10. Turn on electrical power and verify proper unit operation.

Gas Manifold Pressure Measurement and Adjustment (80% & 90% Two-Stage Furnaces)

Natural Gas Adjustments

WARNING

DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING.

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap. Refer to previous *Measuring Manifold Gas Pressure* figure for proper connection.

WARNING

LINE VOLTAGE NOW PRESENT

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Remove the cap screw from the *high* stage manifold pressure regulator.
5. Using a 3/32" Allen wrench, adjust the *high* stage manifold pressue regulator to the required pressure setting.
6. Reinstall *high* stage cap screw and recheck manifold pressure setting with cap on.
7. Remove the cap screw from the *low* stage manifold pressure regulator.
8. Using a 3/32" Allen wrench, adjust the *low* stage regulator to the required pressure setting.
9. Reinstall *low* stage cap screw and recheck manifold pressure setting with cap on.

WARNING

DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING.

10. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall gas valve outlet pressure tap plug before turning on gas to furnace.
11. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
12. Turn on electrical power and verify proper unit operation. Make sure furnace operates at the proper manifold pressure at both high and low stage outputs.

Manifold Gas Pressure			
Gas	Rate	Range	Nominal
Natural Gas	High Stage	3.2 to 3.8" w.c.	3.5" w.c.
	Low Stage	1.6 to 2.2" w.c.	1.9" w.c.

Propane Gas Adjustments

WARNING

DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING.

1. After turning off gas to furnace at the manual gas shutoff valve external to the furnace, remove burner compartment door to gain access to the gas valve.
2. Connect a calibrated water manometer (or appropriate gas pressure gauge) at the gas valve outlet pressure tap. Refer to previous *Measuring Manifold Gas Pressure* figure for proper connection.

WARNING

LINE VOLTAGE NOW PRESENT

3. Turn ON the gas and electrical power supply and operate the furnace.
4. Remove the cap screw from the *low* stage manifold pressure regulator.
5. Using a 3/32" Allen wrench, increase low fire manifold pressure by adjusting the *low* stage manifold regulator so the furnace will light and carryover.
6. Remove the cap screw from the *high* stage manifold pressure regulator adjustment location.
7. Using a 3/32" Allen wrench, adjust the *high* stage manifold pressure regulator to the required manifold pressure.
8. Reinstall *high* stage manifold regulator cap screw. Recheck manifold pressure setting with cap on.

9. Using a 3/32" Allen wrench, adjust the *low* stage manifold pressure regulator to the required manifold pressure.
10. Reinstall *low* stage manifold cap screw and recheck manifold pressure setting with cap on.

⚠ WARNING

HIGH VOLTAGE

DISCONNECT ALL ELECTRICAL POWER AND SHUT OFF GAS SUPPLY BEFORE SERVICING OR INSTALLING. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



11. Disconnect manometer after turning off gas at manual shutoff valve. Reinstall gas valve outlet pressure tap plug before turning on gas to furnace.
12. Turn on gas to furnace and check for leaks. If leaks are found, repair and then reinstall burner compartment door.
13. Turn on electrical power and verify proper unit operation. Make sure furnace operates at the proper manifold pressure at both high and low stage outputs.

Manifold Gas Pressure			
Gas	**Rate**	**Range**	**Nominal**
Propane Gas	High Stage	9.7 to 10.3" w.c.	10.0" w.c.
	Low Stage	5.7 to 6.3" w.c.	6.0" w.c.

S-19 CHECKING FOR DELAYED IGNITION

Delayed ignition is a delay in lighting a combustible mixture of gas and air which has accumulated in the combustion chamber.

When the mixture does ignite, it may explode and/or rollout causing burning in the burner venturi.

If delayed ignition should occur, the following should be checked:

1. Improper gas pressure - adjust to proper pressure (See *S-18 CHECKING GAS PRESSURE*).
2. Improper burner positioning - burners should be in locating slots, level front to rear and left to right.
3. Carry over (lighter tube or cross lighter) obstructed - clean.
4. Main burner orifice(s) deformed, or out of alignment to burner - replace.

S-20 CHECKING FOR FLASHBACK

Flashback will also cause burning in the burner venturi, but is caused by the burning speed being greater than the gas-air flow velocity coming from a burner port.

Flashback may occur at the moment of ignition, after a burner heats up or when the burner turns off. The latter is known as extinction pop.

Since the end results of flashback and delayed ignition can be the same (burning in the burner venturi) a definite attempt should be made to determine which has occurred.

If flashback should occur, check for the following:

1. Improper gas pressure - adjust to proper pressure (See *S-18 CHECKING GAS PRESSURE*)..
2. Check burner for proper alignment and/or replace burner.
3. Improper orifice size - check orifice for obstruction.

S-21 CHECKING DUCT STATIC

The maximum and minimum allowable external static pressures are found in the specification section. These tables also show the amount of air being delivered at a given static by a given motor speed or pulley adjustment.

The furnace motor cannot deliver proper air quantities (CFM) against statics other than those listed.

Too great of an external static pressure will result in insufficient air that can cause excessive temperature rise, resulting in limit tripping, etc. Whereas not enough static may result in motor overloading.

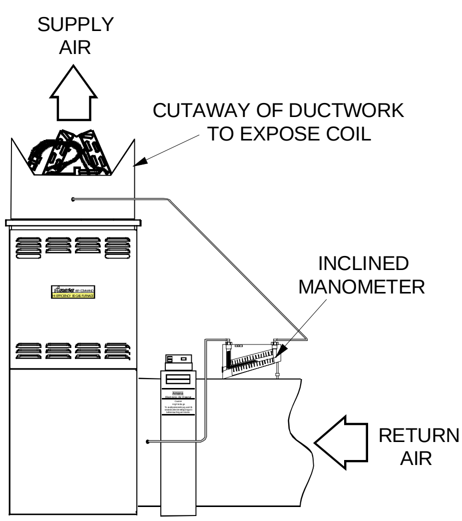
To determine proper air movement, proceed as follows:

1. With clean filters in the furnace, use a draft gauge (inclined manometer) to measure the static pressure (negative pressure) of the return duct at the inlet of the furnace. (Between the furnace and filter.)
2. Measure the static pressure (positive pressure) of the supply duct. (Between the furnace and evaporator coil.)
3. Add the two (2) readings together for total external static pressure.

NOTE: Both readings may be taken simultaneously and read directly on the manometer if so desired. If an air conditioning coil or Electronic Air Cleaner is used in conjunction with the furnace, the readings must also include these components, as shown in the following drawing.

4. Consult proper tables for the quantity of air.

If the total external static pressure exceeds the minimum or maximum allowable statics, check for closed dampers, registers, undersized and/or oversized poorly laid out duct work.

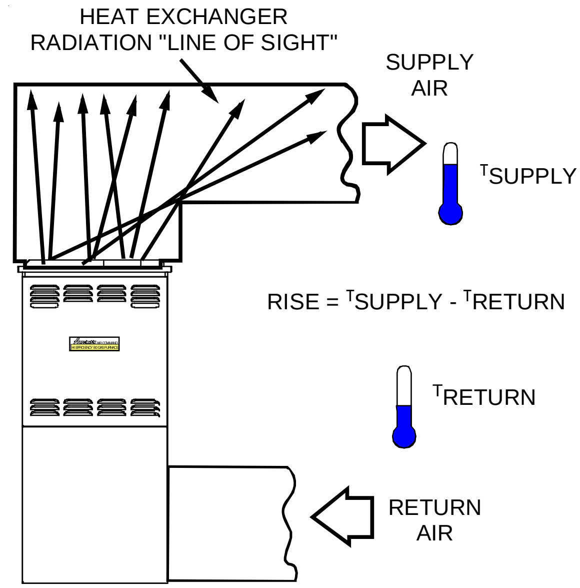


Checking Static Pressure (80% Furnace Shown, 90% Similar)

S-22 CHECKING TEMPERATURE RISE

The more air (CFM) being delivered through a given furnace, the less the rise will be; so the less air (CFM) being delivered, the greater the rise. The temperature rise should be adjusted in accordance to given furnace specifications and its external static pressure. An incorrect temperature rise may result in condensing in or overheating of the heat exchanger. An airflow and temperature rise table is provided in the Technical Information Manual. Determine and adjust temperature rise as follows:

1. Operate furnace with burners firing for approximately ten minutes. Check BTU input to furnace - do not exceed input rating stamped on rating plate. Ensure all registers are open and all duct dampers are in their final (fully or partially open) position.
2. Place thermometers in the return and supply ducts as close to the furnace as possible. Thermometers must not be influenced by radiant heat by being able to "see" the heat exchanger.



Checking Temperature Rise (80% Furnace Shown, 90% Similar)

3. Subtract the return air temperature from the supply air temperature to determine the air temperature rise. Allow adequate time for thermometer readings to stabilize.
4. Adjust temperature rise by adjusting the circulator blower speed. Increase blower speed to reduce temperature rise. Decrease blower speed to increase temperature rise. Refer to *Circulator Blower Speed* section in the Product Design section of this manual for speed changing details. Temperature rise is related to the BTUH output of the furnace and the amount of air (CFM) circulated over the heat exchanger. Take motor amperage draw to determine that the motor is not overloaded during adjustments.

ACCESSORY WIRING DIAGRAMS

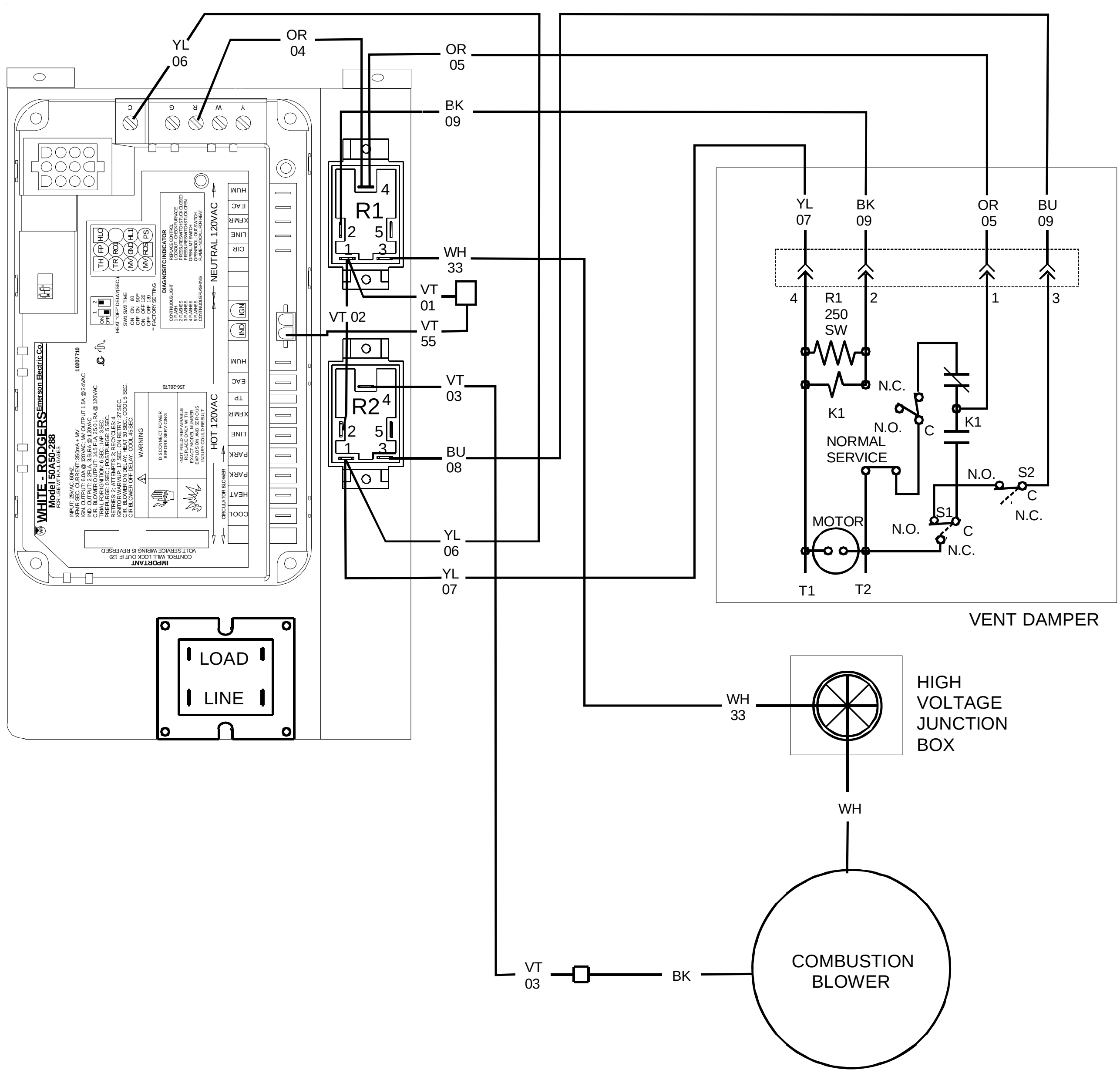
WARNING — **HIGH VOLTAGE! DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

FURNACE COMMON VENT KIT- CVK4-7

(80% Furnaces with White-Rodgers 50A50 Integrated Ignition Control)

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

(For use only with 80% Single-Stage Furnaces)



Point to Point Wiring

ACCESSORY WIRING DIAGRAMS

WARNING

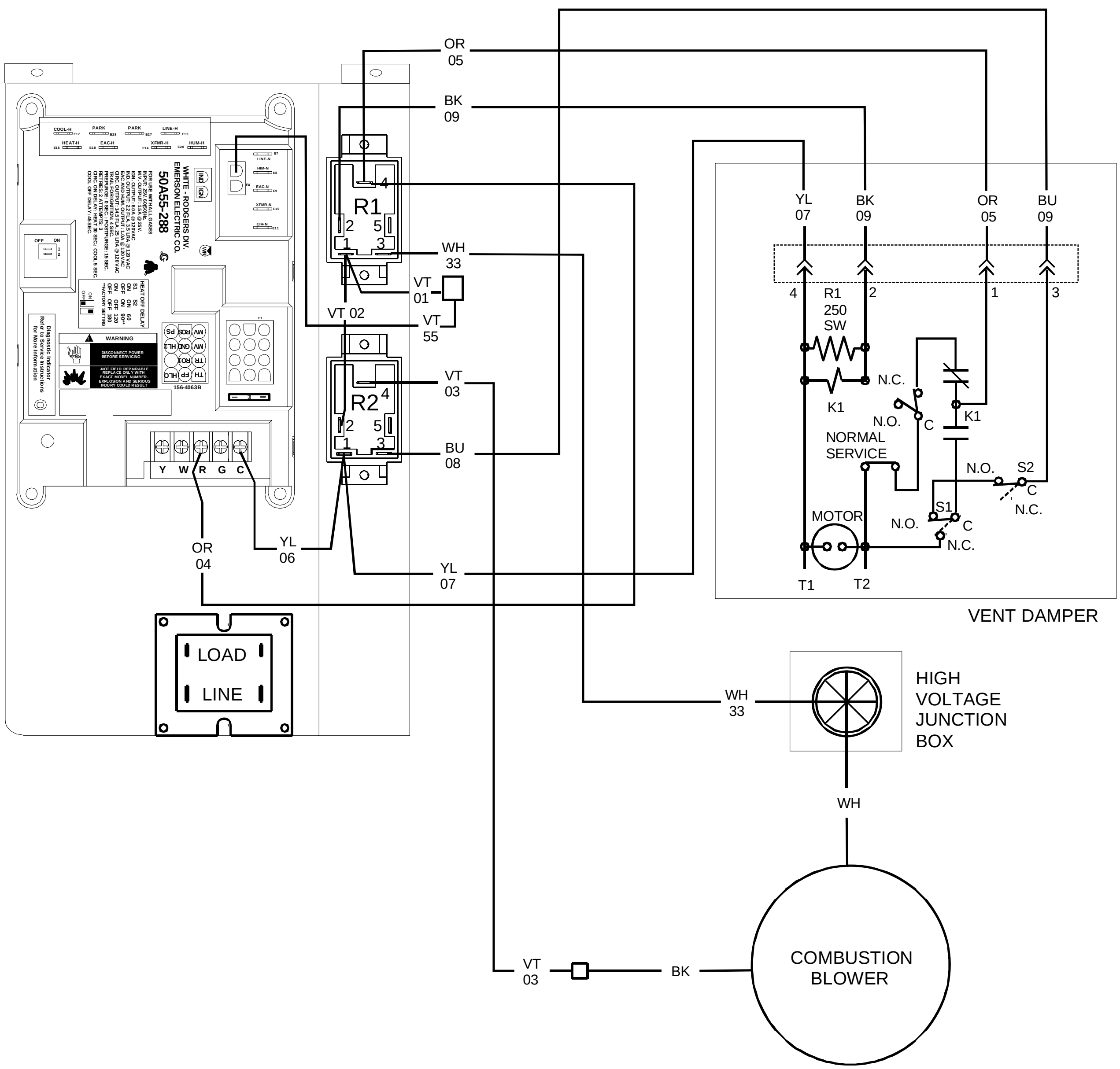
HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

FURNACE COMMON VENT KIT- CVK4-7

(80% Furnaces with White-Rodgers 50A55 Integrated Ignition Control)

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.

(For use only with 80% Single-Stage Furnaces)



Point to Point Wiring

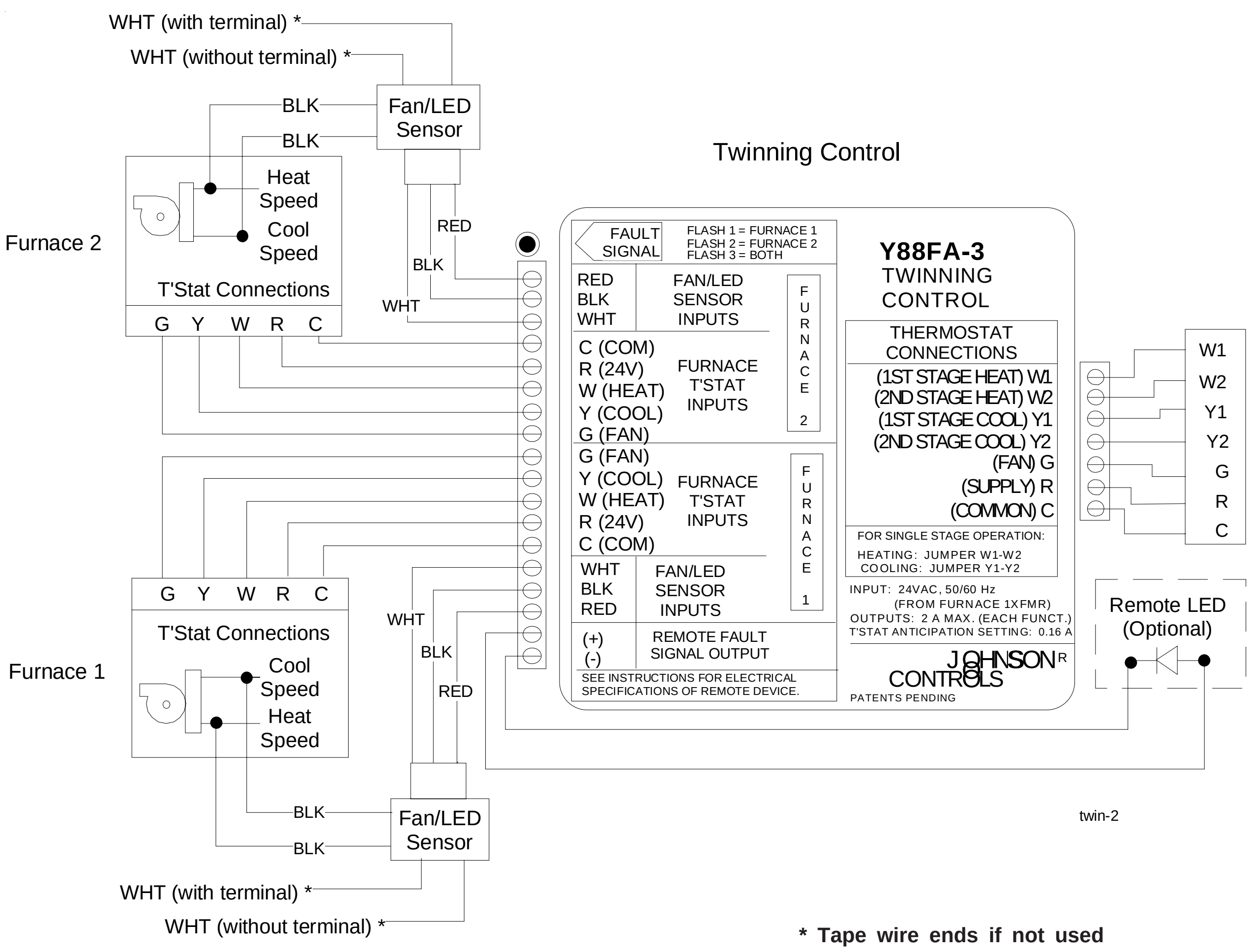
ACCESSORY WIRING DIAGRAMS

WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

FURNACE TWINING KIT - FTK03A

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.
(For use only with 80% or 90% Single-Stage Furnaces)



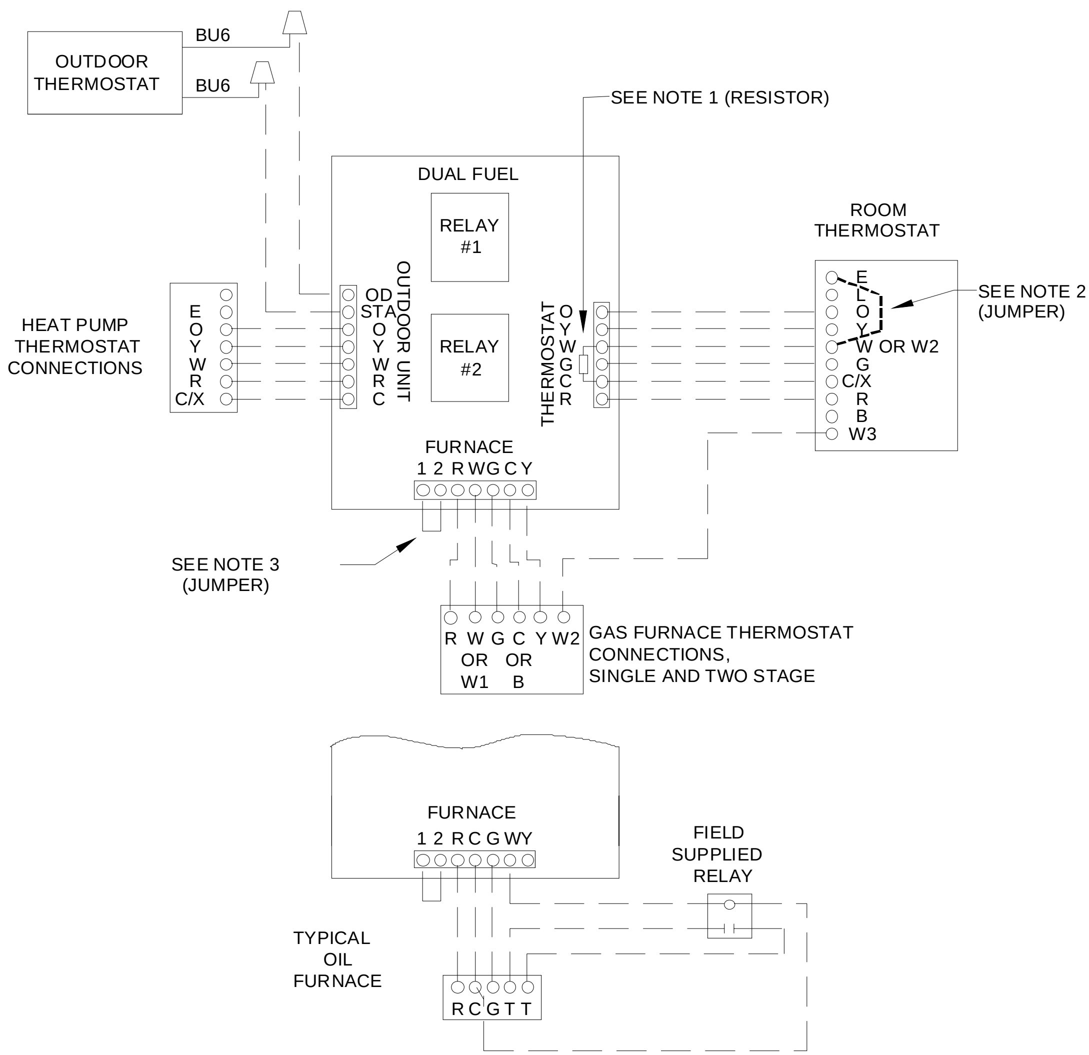
*** Tape wire ends if not used**

ACCESSORY WIRING DIAGRAMS

WARNING HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

FOSSIL FUEL KIT - FFK03A

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.
(For use with Amana® brand Heat Pumps in conjunction with 80% or 90% Single-Stage or Two-Stage Furnaces)



Notes:

1. Resistor must be installed between "W" and "C" if an electronic room thermostat is used.
2. Some room thermostats will require a jumper between "E" and "W" in order to energize furanace in emergency heat mode.
3. Intall jumper from "1" to "2" for air tempering during defrost.

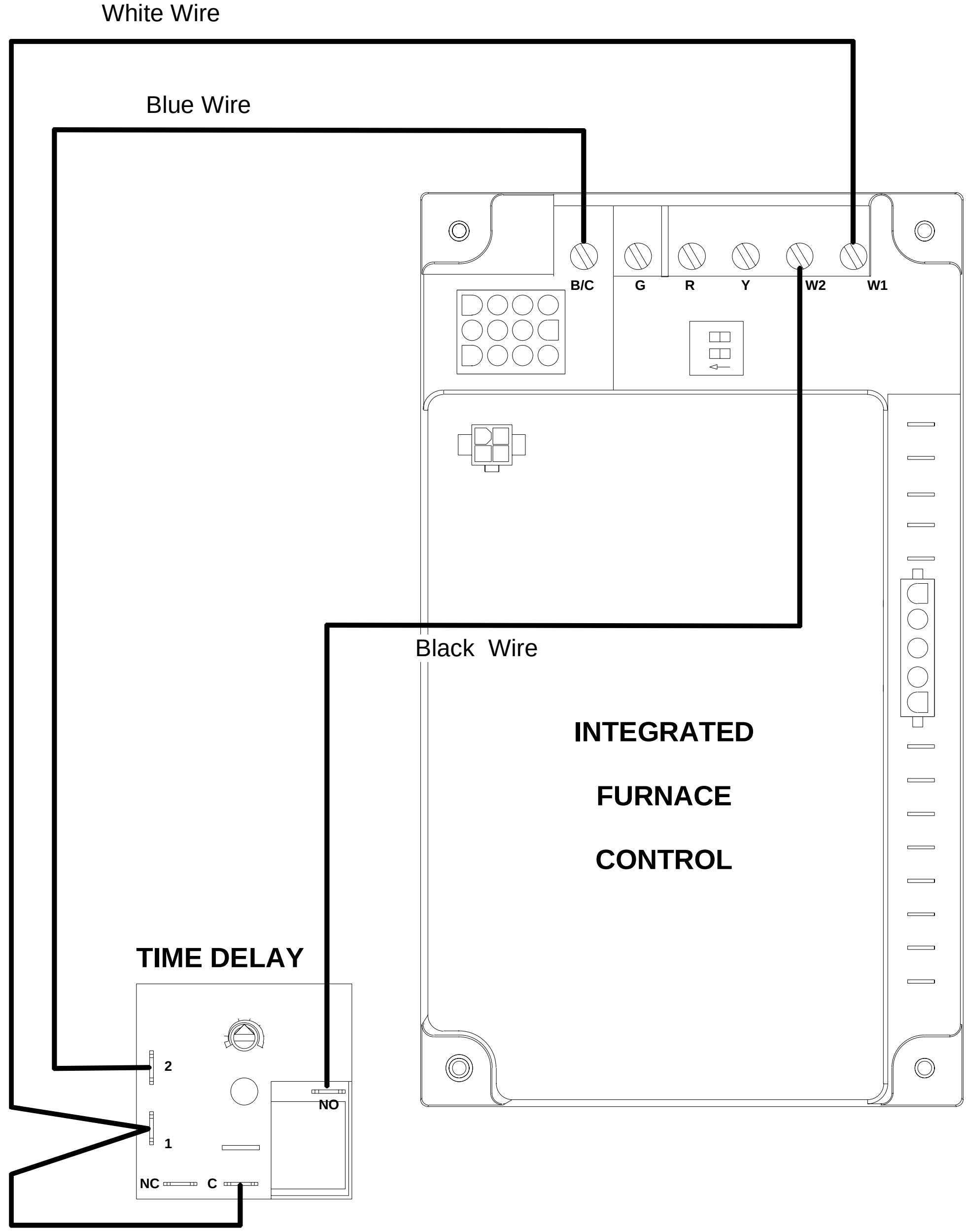
ACCESSORY WIRING DIAGRAMS

WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

TWO-STAGE RELAY KIT - TSRK01

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced.
(For use only with GUIV-CA/DX or GUVA-AX Two-Stage Furnaces)

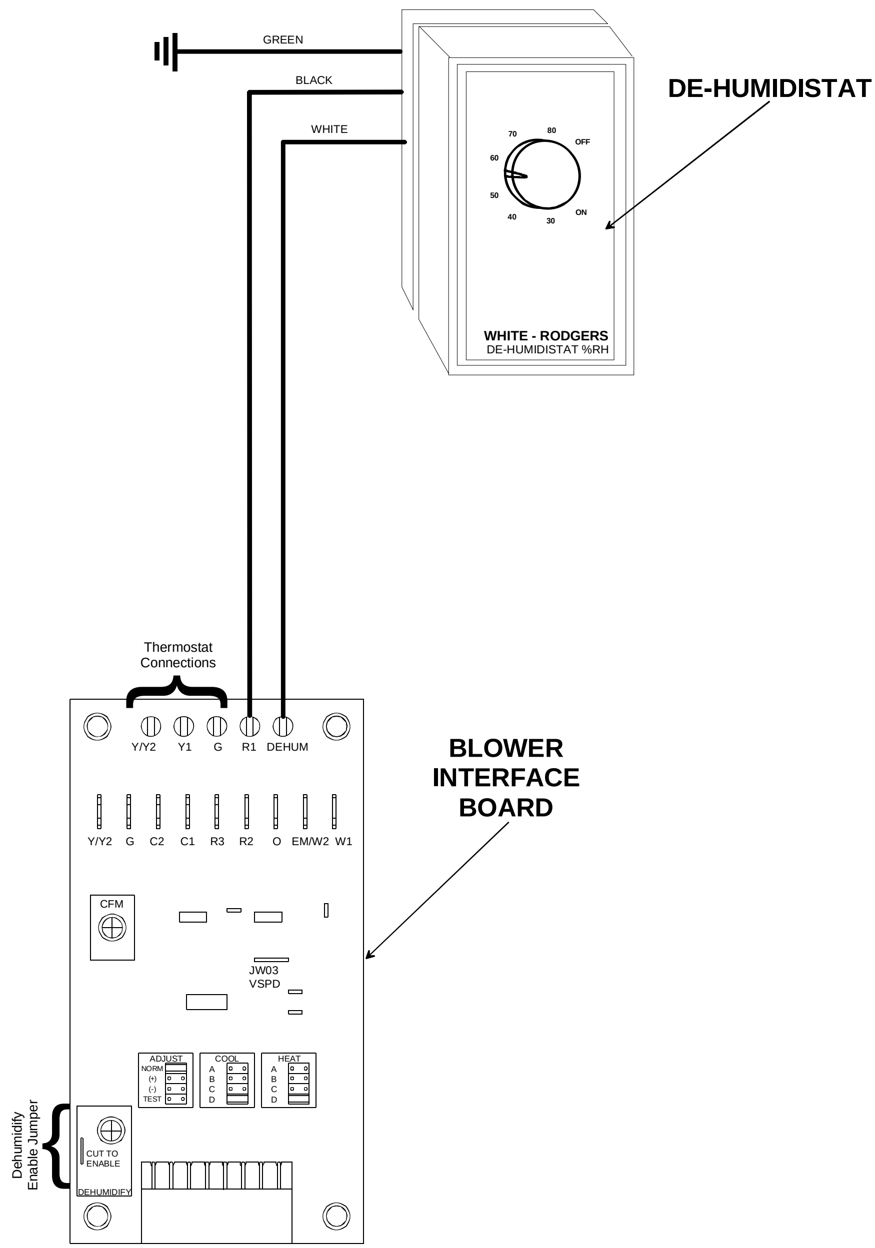


ACCESSORY WIRING DIAGRAMS

> **WARNING**
> **HIGH VOLTAGE!**
> **DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

DE-HUMIDISTAT - DEHUM1

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced. (GUIV-CA/DX or GUVA-AX Two-Stage Variable Speed Furnaces)

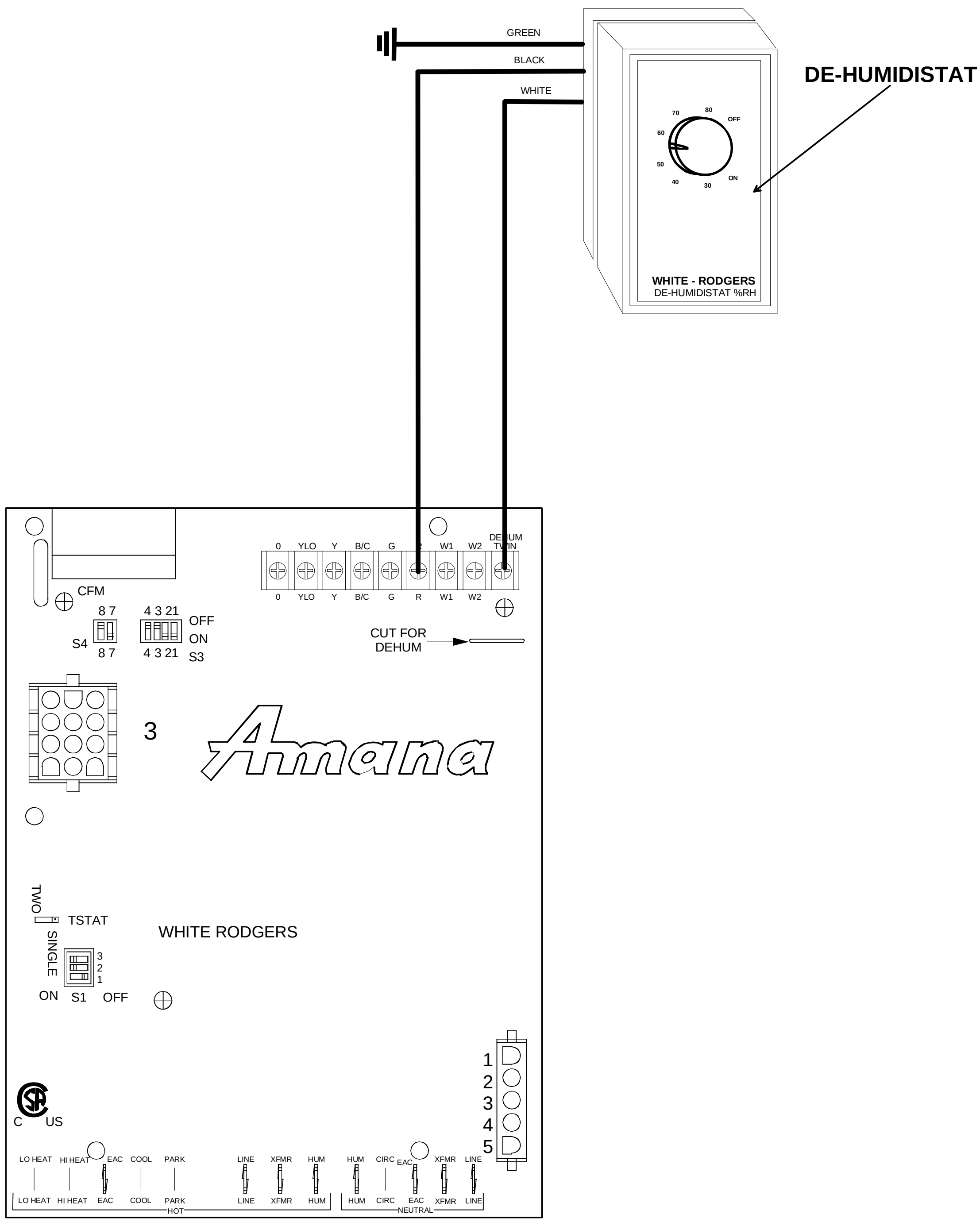


ACCESSORY WIRING DIAGRAMS

WARNING — **HIGH VOLTAGE!**
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

DE-HUMIDISTAT - DEHUM1

This wiring diagram is for reference only. Not all wiring is as shown above, refer to the appropriate wiring diagram for the unit being serviced. (GUVA-BX/CX & GUIV-FX Two-Stage Variable Speed Furnaces)



INTEGRATED IGNITION CONTROL (50V61-288)